

34414

# **PRELIMINARY ASSESSMENT**

## **FIGGIE FIRE SYSTEMS**

**Swainsboro  
Emanuel County, Georgia  
GA0001402007**

*[Handwritten signature]*  
NFC/DP  
11/21/96

Prepared for

U.S. Environmental Protection Agency  
Region IV

Prepared by

Penny Gaynor  
Georgia Department of Natural Resources  
Environmental Protection Division

September 27, 1996

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## **Preliminary Assessment**

### **Figgie Fire Systems**

#### **Swainsboro, Emanuel County, Georgia**

## **1.0 INTRODUCTION**

Under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the U.S. Environmental Protection Agency (EPA), Waste Management Division has authorized the Georgia Department of Natural Resources, Environmental Protection Division (EPD) to conduct a Preliminary Assessment (PA) at the Figgie Fire Systems property in Swainsboro, Emanuel county, Georgia. The purpose of the investigation was to collect information concerning conditions at the Figgie Fire Systems property sufficient to assess the threat posed to human health and the environment and the determine the need for additional CERCLA/SARA or other appropriate action. The scope of the investigation included review of available information, a comprehensive target survey, and a review of on-site and off-site reconnaissance field notes (January 29, 1996).

## **2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS**

### **2.1 Location**

The Figgie Fire Systems property is located at 204 East Meadow Lake Parkway, southeast of downtown Swainsboro, Emanuel County, Georgia. The geographic coordinates are 32° 34' 54" N latitude and 82° 18' 47" W longitude (Reference 1). To reach the site, travel south from downtown Swainsboro on Hwy. US 1, and turn left on Meadow Lake Parkway. The site is approximately 0.25 miles from the intersection of US 1 and Meadow Lake Parkway on the right side of the road.

The area is characterized by a mild climate. Summers are hot and humid with daily temperatures reaching 95°F or higher. The winters are generally mild with daily minimum temperatures as low as 32°F. Mean annual precipitation is nearly 49 inches (Reference 2).

### **2.2 Site Description**

The total area of the Figgie Fire Systems property is approximately 3 acres, of which approximately less than one acre has documented contamination (Reference 3,4,5). Access to the site is from Meadow Lake Parkway, to the north of the site. North of Meadow Lake Parkway there is undeveloped farm land with a swampy area that receives storm water runoff from the site. The former George J. Meyer Manufacturing facility (also owned by Figgie Properties) lies to the east of the site. Space Place, a small paved road lies to the south of the site. The property to the west of the

site is owned by the City of Swainsboro Joint Development Authority. That property is currently being leased to Capro Inc., a manufacturer of outdoor power equipment. A site map is included in Figure 1.

There are currently four building on the property. The buildings forms two boundaries and a fence located behind the buildings. There is no fence between the site and the property to the west.

### **2.3 Operational History and Waste Characteristics**

Currently the site is owned by Figgie Properties of Cleveland, Ohio. The site was previously used by Automatic Sprinkler Corporation of America as a manufacturing plant for fire control systems (Reference 4). This portion of the site is not currently in use. The building in the southern portion of the site is being used by Chemetron who also manufactures fire control systems (Reference 4). The date when the property became developed is unknown (sometime between 1949 and 1969) according to aerial photographs (Reference 4).

While the site was being used by the Automatic Sprinkler Corporation of America, processes that occurred included machining of metal parts, cleaning of metal parts, painting and coating. Hazardous constituents that may have been used would have included: solvents, oils, greases, and paints (Reference 4).

## **3.0 GROUND WATER PATHWAY**

### **3.1 Hydrogeologic Setting**

Emanuel County is located in the Coastal Plain province of Georgia. This province is characterized by a southeastward-thickening wedge of poorly consolidated sand, clay, and limestone of Late Cretaceous to Holocene age (Reference 6). This sedimentary sequence unconformably overlies Paleozoic crystalline rocks or lower Mesozoic sedimentary and igneous rocks (Reference 6). These formations include the following (from youngest to oldest): Barnwell, Lisbon-McBean, Upper Huber-Tallahatta, Baker Hill-Nanafalla, and Lower Huber-Ellenton (Reference 6).

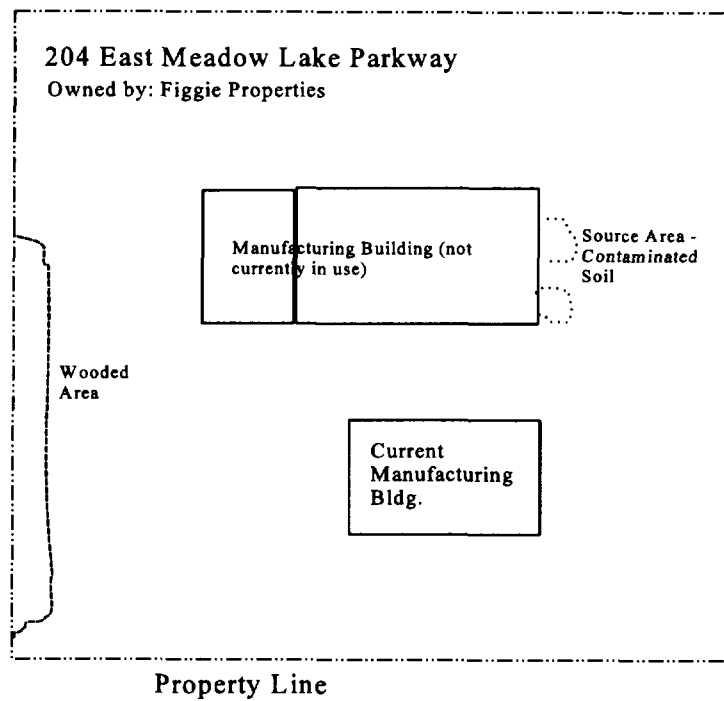
The Barnwell formation (at the most 230 feet thick) consists of an ascending sequence of calcareous sand, thinly bedded fossiliferous limestone, well-laminated clay, and cross-bedded sand. The Lisbon-McBean formation consists of massive, gray-green glauconitic marl interlayered with calcareous, clayey quartz sand and fossiliferous limestone. The Upper Huber-Tallahatta formation consists of fine to medium, subangular to subrounded, well-sorted, clayey quartz sand and is approximately 140 feet thick in the area of the site (Reference 6).

The local aquifers in the area include the Jacksonian, Gordon, Dublin, and Midville. Ground water withdrawal wells for the city of Swainsboro are at a minimum of 200 feet in depth (Reference 7). Shallower ground water may be encountered in areas near the site, however, this ground water is not a primary source of drinking water.

Figure 1: Site Map

Meadow Lake Parkway

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Map Not To Scale

### 3.2 Ground Water Targets

The drinking water for the population within a 4-mile radius is provided by municipal and private ground water wells. The city of Swainsboro provides drinking water to its residents from four wells located within the 4-mile radius of the site (an additional fifth well provides water for industrial purposes only)(Reference 8, 13). The four wells form a blended system with approximately 2877 connections. Residents not receiving drinking water from the city of Swainsboro have private wells. The CENTRACTS report identifies the population on private wells within the 4-mile radius of the site (Reference 9).

The breakdown of the population served by private or municipal water is each of the distance rings is included in Table 1. The total population served by ground water within a 4-mile radius is 8043.

**Table 1: Drinking Water Population Served by Ground Water**

Distance Rings (miles)	Population Served By Private Wells	Population Served By City Water	Total Population Served by Ground Water
0 - 0.25	4	0	4
0.25 - 0.50	10	0	10
0.50 - 1.0	48	1799	1847
1.0 - 2.0	169	1799	1968
2.0 - 3.0	278	3597	3875
3.0 - 4.0	339	0	339

### 3.3 Ground Water Conclusions

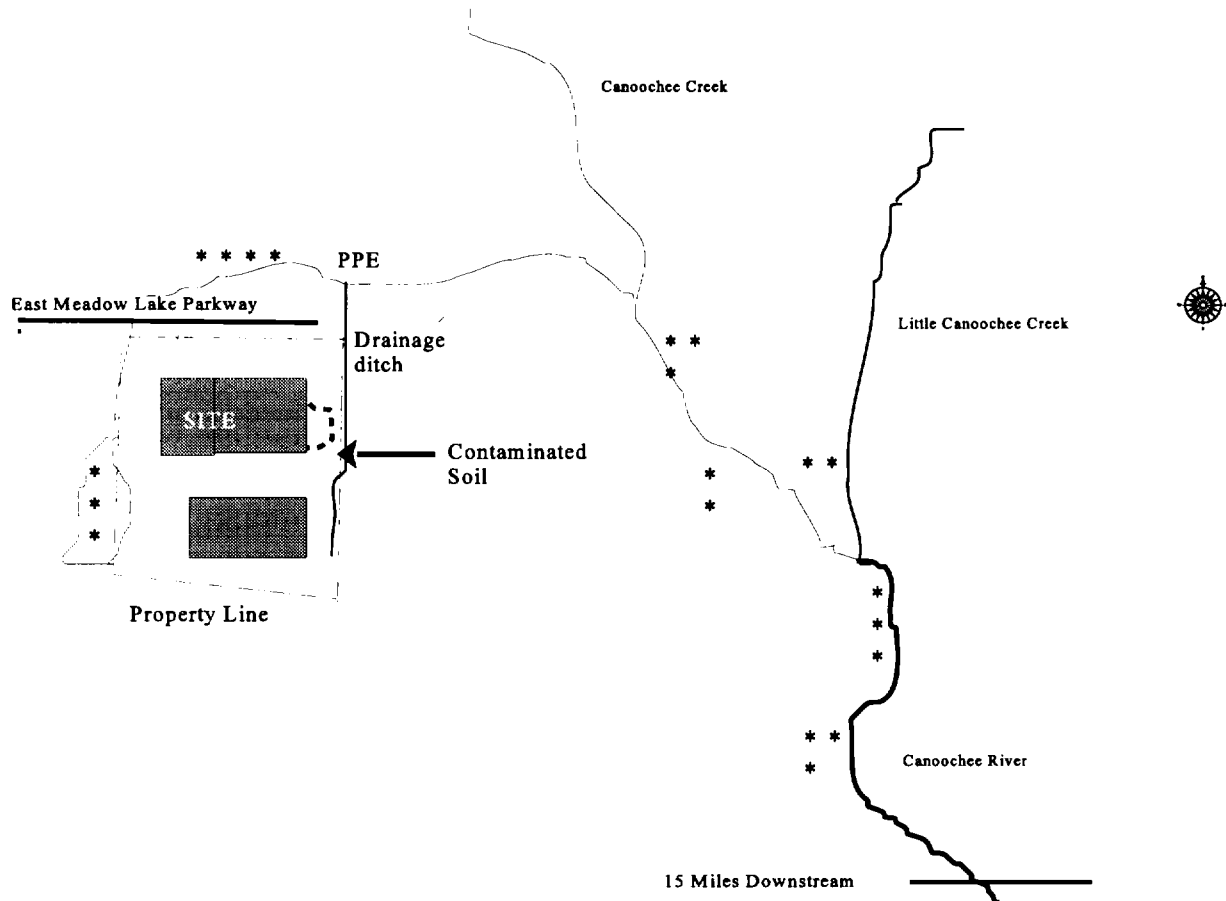
A release of hazardous substances from the Figgie Fire Systems property to the ground water is not suspected due to the small waste quantity documented at the site. Since a release is not suspected no primary targets exist for ground water. However, the population served by ground water within the 4-mile radius are considered secondary targets.

## 4.0 SURFACE WATER PATHWAY

### 4.1 Hydrologic Setting

Surface water run-off from the source area is to the east to a small ditch that drains to the north approximately 250 feet to an unnamed tributary of Canoochee Creek (Reference 10). The unnamed tributary flows southeast approximately 2.5 miles to Canoochee Creek. Canoochee Creek flows

Figure 2: Surface Water Pathway



Legend

\* \* \* Wetlands

PPE Probable Point of Entry

Map Not To Scale

southeast approximately 7 miles to where it joins with Little Canoochee Creek to form the Canoochee River (Reference 1 ,11). The flow rate for Canoochee Creek is estimated at 20 cfs, but is not constant due to seasonal changes. The flow rate for the Canoochee River ranges from 585 to 807 cfs (Reference 12). Figure 2 shows the surface water pathway 15 miles downstream of the site.

## 4.2 Surface Water Targets

There are no drinking water intakes located within 15 downstream miles of the site (Reference 13). Most residents of Emanuel county receive their drinking water from a municipal, blended ground water well system. Residents not served by a municipal system receive water from private wells (Reference 9).

**Table 2: Protected Plants and Animals**  
(Reference 15, 16)

Name	Designation*
<i>Balduina atropurpurea</i> (Purple Balduina)	Rare
<i>Ceratiola ericoides</i> (Sandhill Rosemary)	Threatened
<i>Elliottia racemosa</i> (Elliottia)	Threatened
<i>Fothergilla gardenii</i> (Dwarf Witch-alder)	Threatened
<i>Marshallia romosa</i> (Pineland Barbara Buttons)	Rare
<i>Penstemon dissectus</i> (Cutleaf Beardtongue)	Rare
<i>Sarracenia flava</i> (Yellow Flytrap)	Unusual
<i>Sarracenia minor</i> (Hooded Pitcherplant)	Unusual
<i>Sarracenia psittacina</i> (Parrot Pitcherplant)	Threatened
<i>Sarracenia rubra</i> (Red Pitcherplant)	Endangered
<i>Stylisma pickeringii</i> (Pickering Morning-glory)	Threatened
American Alligator	Threatened
<i>Drymarchon corais couperi</i> (Eastern Indigo Snake)	Threatened
<i>Mycteria americana</i> (Wood Stork)	Endangered
<i>Picoides borealis</i> (Red Cockaded Woodpecker)	Endangered

\*The designation of plants is Georgia's classification. The designation of animals is the federal classification.



Canoochee Creek and Canoochee River are used for recreational fishing. Some of the commonly caught species include: catfish, large mouth bass, red fin pike, and brim (Reference 14).

There are numerous wetlands located within 15 downstream miles of the site (Reference 11). The nearest wetland is located approximately 250 feet from the site on the unnamed tributary to Canoochee Creek (Reference 11). Several endangered, threatened, rare or unusual species whose habitats include Emanuel and Candler counties (surface water pathway also includes Candler county) may be found along the surface water pathway (Reference 15,16). Table 2 lists the plants and animals of concern.

#### **4.3 Surface Water Conclusions**

A release to surface water is not suspected due to the fact that a sample was collected and contamination was not found (Reference 5). There are no drinking water intakes within 15 miles downstream of the site. There are numerous wetlands along the 15 downstream miles, also several endangered and threatened species habitat may occur. Canoochee Creek and Canoochee River are also used as a recreational fishery. No primary targets exists since a release has not occurred. However, the wetlands, creek, and river are secondary targets.

### **5.0 SOIL EXPOSURE AND AIR PATHWAYS**

#### **5.1 Physical Conditions**

The Figgie Fire Systems property is located in a rural/industrial area approximately 1 mile southeast of the town of Swainsboro, Georgia. A portion of the property is still in use for manufacturing of fire control systems. A fence prohibits access to the site.

#### **5.2 Soil and Air Targets**

There are approximately 16 workers at the site. No residences are on the site. The nearest residence is greater than 200 feet from the site. There are 8 people that live within 0.25 miles of the site (Reference 11). The total population within a 4-mile radius of the site is 6,759 (Reference 11).

There are numerous wetlands located within the 4-mile radius of the site. The closest wetland is on the north side of Meadow Lake Parkway. No protected species are suspected to live on the site, however, several protected plants and animals due occur in Emanuel County.

#### **5.3 Soil Exposure and Air Pathway Conclusions**

The soil exposure pathway poses a minimal threat at the Figgie Fire Systems property since metals contamination has been found in a small area on the east side of the site (Reference 3,4,5). The area is located outside the fence line so access is unlimited. Due to the fact that the site is located in an

industrial area there are few potential targets. A release to air is not suspected due to the nature of the contamination.

## **6.0 SUMMARY AND CONCLUSIONS**

Manufacturing of fire control systems has occurred at the Figgie Fire Systems property in Swainsboro, Emanuel County, Georgia for the past few decades. The exact date operations began on the property is not known at this time. During this time spills of paints, oils, greases, or solvents may have occurred. Two known areas of contaminated soils have been determined. Several environmental investigations have been performed at the site by Figgie Properties to determine the extent of contamination. No release is suspected to the air, ground water or surface water due to the results of sampling. A release has occurred to the soil pathway, but is only in a small area. No residences, day care centers, or schools are within 200 feet of contamination.

## REFERENCES

1. U.S. Geological Survey, 7.5 minute series Topographical Maps of Georgia: Norristown 1971, Swainsboro 1971, Twin City 1971, and Summertown 1982.
2. Average Annual Rainfall and Runoff in Georgia, 1941-1970, Robert Carter and Harold Stiles, Georgia Geologic Survey, 1983, Hydrologic Atlas 9.
3. Phase 1 Environmental Assessment Report, Automatic Sprinkler Corporation of America Fire Systems, Swainsboro, Georgia, October 20, 1989.
4. Phase 1 Environmental Site Assessment, 204 East Meadow Lake Parkway ASCOA Fire Systems, Swainsboro, Georgia, October 1993.
5. EMCON Sampling and Analysis, Figgie Properties, Swainsboro, Georgia, August 1994
6. Hydrogeology of the Gordon Aquifer System of East-Central Georgia, Rebekah Brooks, John S. Clarke, and Robert E. Faye; Department of Natural Resources, Environmental Protection Division, Georgia Geologic Survey, 1985.
7. Boring/Well Logs for the City of Swainsboro Water Supply Wells.
8. Water Supply Wells location map, fax to Terri Crosby of EPD from OMI, Inc., August 22, 1996.
9. Frost Associates, letter to James Ussery, Georgia Environmental Protection Division, regarding 1990 Census information (population and water well information), February 1996.
10. Site Reconnaissance, Figgie Fire Systems property, Field notes of Terri Crosby, Georgia Environmental Protection Division, January 29, 1996.
11. National Wetlands Inventory Map, U.S. Department of the Interior, Fish and Wildlife Service, Swainsboro, Twin City, and Stillmore Quadrangles.
12. Donney Peebles, Department of Natural Resources, Fisheries Management Section, telephone conversation with Terri Crosby, Environmental Engineer, Hazardous Waste Management Branch, Environmental Protection Division, August 28, 1996. RE: Flow Rates of Canoochee River.
13. Don Lawson, Project Administrator, Operations Management International, City of Swainsboro, telephone conversation with Terri Crosby, Environmental Engineer, Hazardous

Waste Management Branch, Georgia Environmental Protection Division, August 20, 1996.  
RE: City Drinking Water Source, Location of Wells, System Type, and # of Connections.

14. Bryan Shanner, Forest Ranger, Department of Natural Resources, telephone conversation with Terri Crosby, Environmental Engineer, Hazardous Waste Management Branch, Georgia Environmental Protection Division, August 28, 1996. RE: Flow Rate of Canoochee Creek and fish species usually caught in fisheries near the site.
15. Protected Plants of Georgia, Georgia Department of Natural Resources, Wildlife Resources Division, Georgia Natural Heritage Program, 1995.
16. Georgia's Protected Wildlife County Cross-Reference, Georgia Department of Natural Resources, Wildlife Resources Division, Nongame-Endangered Wildlife Program.
17. Flood Insurance Rate Map, City of Swainsboro, Emanuel County, Georgia, Federal Emergency Management Agency, February 4, 1988.

**UNSCANNABLE**

**MEDIA**

**(PHOTOGRAPHS)**

## APPENDIX A

OMB Approval Number: 2050-0095  
Approved for Use Through: 1/92

# PA Scoresheets

!

Site Name: Figgie Fire Systems

CERCLIS ID No.: GA00001402007

Street Address: 204 EAST Meadow Lake Pkwy

City/State/Zip: Swainsboro, GA 30401

Investigator: Penny Gaynor

Agency/Organization: GA EPD

Street Address: 205 BUTLER ST.

City/State/Zip: ATLANTA, GA 30334

Date: September 27, 1996

<b>Potential Hazardous Waste Site Preliminary Assessment Form</b>		<b>Identification</b>	
		State: GA	CERCLIS Number: GA0001402007
		CERCLIS Discovery Date: 3/13/96	
<b>1. General Site Information</b>			
Name: Figgie Fire Systems		Street Address: 204 East Meadow Lake Parkway	
City: Swainsboro	State: GA	Zip Code: 30401	County: EMANUEL
Latitude: 32° 34' 54.0"		Longitude: 82° 18' 47.0"	Approximate Area of Site: ~ 3 Acres
		Status of Site: <input checked="" type="checkbox"/> Active <input type="checkbox"/> Not Specified <input type="checkbox"/> Inactive <input type="checkbox"/> NA (GW plume, etc.)	
<b>2. Owner/Operator Information</b>			
Owner: Figgie Properties		Operator: Ken Mercer	
Street Address: 28300 Euclid Ave. Suite 100		Street Address: 204 East Meadow Lake Parkway	
City: Cleveland		City: Swainsboro	
State: OH	Zip Code: 44092	Telephone: (216) 289-5300	State: GA
		Zip Code: 30401	Telephone: (912) 237-6651
Type of Ownership: <input checked="" type="checkbox"/> Private <input type="checkbox"/> County <input type="checkbox"/> Federal Agency <input type="checkbox"/> Municipal <input type="checkbox"/> State <input type="checkbox"/> Not Specified <input type="checkbox"/> Indian <input type="checkbox"/> Other		How Initially Identified: <input type="checkbox"/> Citizens Complaint <input type="checkbox"/> Federal Program <input type="checkbox"/> PA Petition <input type="checkbox"/> Incidental <input checked="" type="checkbox"/> State/Local Program <input type="checkbox"/> Not Specified <input type="checkbox"/> RCRA/CERCLA Notification <input type="checkbox"/> Other	
<b>3. Site Evaluator Information</b>			
Name of Evaluator: Penny Gaynor		Agency/Organization: GA EPD	
Date Prepared: 9/27/96			
Street Address: 205 Butler St. Suite 1162		City: Atlanta	
State: GA			
Name of EPA or State Agency Contact: Jim Ussery		Street Address: 205 Butler St. Suite 1162	
City: Atlanta		State: GA	
		Telephone: (404) 656-2833	
<b>4. Site Disposition (for EPA use only)</b>			
Emergency Response/Removal Assessment Recommendation: <input type="checkbox"/> Yes <input type="checkbox"/> No Date: _____		CERCLIS Recommendation: <input type="checkbox"/> Higher Priority SI <input type="checkbox"/> Lower Priority SI <input type="checkbox"/> NFRAP <input type="checkbox"/> RCRA <input type="checkbox"/> Other Date: _____	
Signature:		Name (typed):	
Position:			







Potential Hazardous Waste Site  
Preliminary Assessment Form - Page 3 of 4

CERCLIS Number:

GA0001402007

### 7. Ground Water Pathway

<p>Is Ground Water Used for Drinking Water Within 4 Miles:</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Is There a Suspected Release to Ground Water:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>List Secondary Target Population Served by Ground Water Withdrawn From:</p> <table><tr><td>0 - 1/4 Mile</td><td><u>4</u></td></tr><tr><td>&gt; 1/4 - 1/2 Mile</td><td><u>10</u></td></tr><tr><td>&gt; 1/2 - 1 Mile</td><td><u>1847</u></td></tr><tr><td>&gt; 1 - 2 Miles</td><td><u>1968</u></td></tr><tr><td>&gt; 2 - 3 Miles</td><td><u>3875</u></td></tr><tr><td>&gt; 3 - 4 Miles</td><td><u>339</u></td></tr><tr><td>Total Within 4 Miles</td><td><u>8043</u></td></tr></table>	0 - 1/4 Mile	<u>4</u>	> 1/4 - 1/2 Mile	<u>10</u>	> 1/2 - 1 Mile	<u>1847</u>	> 1 - 2 Miles	<u>1968</u>	> 2 - 3 Miles	<u>3875</u>	> 3 - 4 Miles	<u>339</u>	Total Within 4 Miles	<u>8043</u>
0 - 1/4 Mile	<u>4</u>															
> 1/4 - 1/2 Mile	<u>10</u>															
> 1/2 - 1 Mile	<u>1847</u>															
> 1 - 2 Miles	<u>1968</u>															
> 2 - 3 Miles	<u>3875</u>															
> 3 - 4 Miles	<u>339</u>															
Total Within 4 Miles	<u>8043</u>															
<p>Type of Drinking Water Wells Within 4 Miles (check all that apply):</p> <p><input checked="" type="checkbox"/> Municipal <input checked="" type="checkbox"/> Private <input type="checkbox"/> None</p>	<p>Have Primary Target Drinking Water Wells Been Identified:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If Yes, Enter Primary Target Population:</p> <p>_____ People</p>															
<p>Depth to Shallowest Aquifer:</p> <p><u>20</u> Feet</p> <p>Karst Terrain/Aquifer Present:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>Nearest Designated Wellhead Protection Area:</p> <p><input type="checkbox"/> Underlies Site <input type="checkbox"/> &gt; 0 - 4 Miles <input type="checkbox"/> None Within 4 Miles</p>															

### 8. Surface Water Pathway

<p>Type of Surface Water Draining Site and 15 Miles Downstream (check all that apply):</p> <p><input checked="" type="checkbox"/> Stream <input checked="" type="checkbox"/> River <input type="checkbox"/> Pond <input type="checkbox"/> Lake <input type="checkbox"/> Bay <input type="checkbox"/> Ocean <input type="checkbox"/> Other _____</p>	<p>Shortest Overland Distance From Any Source to Surface Water:</p> <p><u>250</u> Feet _____ Miles</p>																				
<p>Is There a Suspected Release to Surface Water:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>Site is Located in:</p> <p><input type="checkbox"/> Annual - 10 yr Floodplain <input type="checkbox"/> &gt; 10 yr - 100 yr Floodplain <input type="checkbox"/> &gt; 100 yr - 500 yr Floodplain <input checked="" type="checkbox"/> &gt; 500 yr Floodplain</p>																				
<p>Drinking Water Intakes Located Along the Surface Water Migration Path:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Have Primary Target Drinking Water Intakes Been Identified:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If Yes, Enter Population Served by Primary Target Intake:</p> <p>_____ People</p>	<p>List All Secondary Target Drinking Water Intakes:</p> <table><thead><tr><th>Name</th><th>Water Body</th><th>Flow (cfs)</th><th>Population Served</th></tr></thead><tbody><tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr><tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr><tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr><tr><td colspan="4">Total within 15 Miles _____</td></tr></tbody></table>	Name	Water Body	Flow (cfs)	Population Served	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	Total within 15 Miles _____			
Name	Water Body	Flow (cfs)	Population Served																		
_____	_____	_____	_____																		
_____	_____	_____	_____																		
_____	_____	_____	_____																		
Total within 15 Miles _____																					
<p>Fisheries Located Along the Surface Water Migration Path:</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Have Primary Target Fisheries Been Identified:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>List All Secondary Target Fisheries:</p> <table><thead><tr><th>Water Body/Fishery Name</th><th>Flow (cfs)</th></tr></thead><tbody><tr><td><u>Canoochee Creek</u></td><td><u>~20</u></td></tr><tr><td><u>Canoochee River</u></td><td><u>585</u></td></tr><tr><td>_____</td><td>_____</td></tr><tr><td>_____</td><td>_____</td></tr></tbody></table>	Water Body/Fishery Name	Flow (cfs)	<u>Canoochee Creek</u>	<u>~20</u>	<u>Canoochee River</u>	<u>585</u>	_____	_____	_____	_____										
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<u>Canoochee Creek</u>	<u>~20</u>																				
<u>Canoochee River</u>	<u>585</u>																				
_____	_____																				
_____	_____																				



Potential Hazardous Waste Site  
Preliminary Assessment Form - Page 4 of 4

CERCLIS Number:

GA0001402007

### 8. Surface Water Pathway (continued)

Wetlands Located Along the Surface Water Migration Path:

- ☒ Yes  
☐ No

Have Primary Target Wetlands Been Identified:

- ☐ Yes  
☒ No

List Secondary Target Wetlands:

Water Body	Flow (cfs)	Proximity Miles
Canoochee Cr.	20	~10
Canoochee River	585	~18

Other Sensitive Environments Located Along the Surface Water Migration Path:

- ☐ Yes  
☒ No

Have Primary Target Sensitive Environments Been Identified:

- ☐ Yes  
☒ No

List Secondary Target Sensitive Environments:

Water Body	Flow (cfs)	Sensitive Environment Type

### 9. Soil Exposure Pathway

Are People Occupying Residences or Attending School or Daycare on or Within 200 Feet of Areas of Known or Suspected Contamination:

- ☐ Yes  
☒ No

If Yes, Enter Total Resident Population:

\_\_\_\_\_ People

Number of Workers Onsite:

- ☐ None  
☒ 1 - 100  
☐ 101 - 1,000  
☐ > 1,000

Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination:

- ☐ Yes  
☒ No

If Yes, List Each Terrestrial Sensitive Environment:

\_\_\_\_\_  
\_\_\_\_\_

### 10. Air Pathway

Is There a Suspected Release to Air:

- ☐ Yes  
☒ No

Enter Total Population on or Within:

Onsite	20
0 - 1/4 Miles	8
> 1/4 - 1/2 Miles	76
> 1/2 - 1 Miles	552
> 1 - 2 Miles	2773
> 2 - 3 Miles	2606
> 3 - 4 Miles	746
Total Within 4 Miles	6781

Wetlands Located Within 4 Miles of the Site:

- ☒ Yes  
☐ No

Other Sensitive Environments Located Within 4 Miles of the Site:

- ☐ Yes  
☒ No

List All Sensitive Environments Within 1/4 Mile of the Site:

Distance Sensitive Environment Type/Wetlands Area (acres)

Onsite	
0 - 1/4 Mile	wetlands
> 1/4 - 1/2 Mile	wetlands

## GENERAL INFORMATION

### Site Description and Operational History:

The total area of the Figgie Fire Systems property is approximately 3 acres, of which approximately less than one acre has documented contamination (Reference 3,4,5). Access to the site is from Meadow Lake Parkway, to the north of the site. North of Meadow Lake Parkway there is undeveloped farm land with a swampy area that receives storm water runoff from the site. The former George J. Meyer Manufacturing facility (also owned by Figgie Properties) lies to the east of the site. Space Place, a small paved road lies to the south of the site. The property to the west of the site is owned by the City of Swainsboro Joint Development Authority. That property is currently being leased to Capro Inc., a manufacturer of outdoor power equipment. A site map is included in Figure 1.

There are currently four building on the property. The buildings forms two boundaries and a fence located behind the buildings. There is no fence between the site and the property to the west.

Currently the site is owned by Figgie Properties of Cleveland, Ohio. The site was previously used by Automatic Sprinkler Corporation of America as a manufacturing plant for fire control systems (Reference 4). This portion of the site is not currently in use. The building in the southern portion of the site is being used by Chemetron who also manufactures fire control systems (Reference 4). The date when the property became developed is unknown (sometime between 1949 and 1969) according to aerial photographs (Reference 4).

While the site was being used by the Automatic Sprinkler Corporation of America processes that occurred included machining of metal parts, cleaning of metal parts, painting and coating. Hazardous constituents that may have been used would have included: solvents, oils, greases, and paints (Reference 4).

### Probable Substances of Concern: (Previous investigations, analytical data)

The constituents of concern at the site are metals. Metals contamination was found in soils located outside of the northern manufacturing building. The area was originally sampled in 1989, then the area was resampled in 1994 (References 3, 4, 5). Concentrations of metals in the soils from the 1989 sampling were 6700 ppm Copper, 3000 ppm Lead, and 38 ppm Chromium (Reference 3).

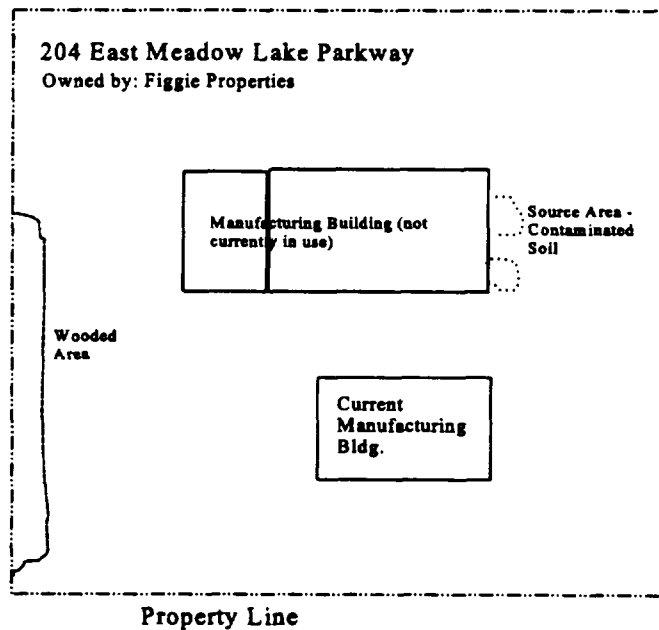
**GENERAL INFORMATION (continued)**

**Site Sketch:**

(Show all pertinent features, indicate sources and closest targets, indicate north)

**Figure 1: Site Map**

**Meadow Lake Parkway**



**Map Not To Scale**

## 4

Source No.: 1	Source Name: Contaminated Soil	Source Waste Quantity (WQ) Calculations:
Source Description:  2 small areas of metals contaminated soil adjacent to the manufacturing area. < 1 acre  Ref. 3,4,5		Area < 1 acre  WC = 18

Source No.:	Source Name:	Source Waste Quantity (WQ) Calculations:
Source Description:		

Source No.:	Source Name:	Source Waste Quantity (WQ) Calculations:
Source Description:		

**Site WC:**

18

PA TABLE 1: WASTE CHARACTERISTICS (WC) SCORES

PA Table 1a: WC Scores for Single Source Sites and Formulas for Multiple Source Sites

TIER	SOURCE TYPE	SINGLE SOURCE SITES (assigned WC scores)			MULTIPLE SOURCE SITES
		WC = 18	WC = 32	WC = 100	
Underground Storage Tanks	N/A	≤ 100 lb	> 100 to 10,000 lb	> 10,000 lb	$lb + 1$
Surface Storage Tanks	N/A	≤ 500,000 lb	> 500,000 to 50 million lb	> 50 million lb	$lb + 5,000$
VOLUME	Landfill	≤ 6.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 6.75 million to 675 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 675 million ft <sup>3</sup> > 25 million yd <sup>3</sup>	$ft^3 + 67,500$ $yd^3 + 2,500$
	Surface impoundment	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 ft <sup>3</sup> > 25,000 yd <sup>3</sup>	$ft^3 + 67.5$ $yd^3 + 2.5$
	Drums	≤ 1,000 drums	> 1,000 to 100,000 drums	> 100,000 drums	$drums + 10$
	Tanks and non-drum containers	≤ 50,000 gallons	> 50,000 to 5 million gallons	> 5 million gallons	$gallons + 500$
	Contaminated soil	≤ 6.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 6.75 million to 675 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 675 million ft <sup>3</sup> > 25 million yd <sup>3</sup>	$ft^3 + 67,500$ $yd^3 + 2,500$
	Pile	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 ft <sup>3</sup> > 25,000 yd <sup>3</sup>	$ft^3 + 67.5$ $yd^3 + 2.5$
	Other	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 ft <sup>3</sup> > 25,000 yd <sup>3</sup>	$ft^3 + 67.5$ $yd^3 + 2.5$
AREA	Landfill	≤ 340,000 ft <sup>2</sup> ≤ 7.8 acres	> 340,000 to 34 million ft <sup>2</sup> > 7.8 to 780 acres	> 34 million ft <sup>2</sup> > 780 acres	$ft^2 + 3,400$ $acres + 0.078$
	Surface impoundment	≤ 1,300 ft <sup>2</sup> ≤ 0.029 acres	> 1,300 to 130,000 ft <sup>2</sup> > 0.029 to 2.9 acres	> 130,000 ft <sup>2</sup> > 2.9 acres	$ft^2 + 13$ $acres + 0.00029$
	Contaminated soil	≤ 3.4 million ft <sup>2</sup> ≤ 78 acres	> 3.4 million to 340 million ft <sup>2</sup> > 78 to 7,800 acres	> 340 million ft <sup>2</sup> > 7,800 acres	$ft^2 + 34,000$ $acres + 0.78$
	Pile*	≤ 1,300 ft <sup>2</sup> ≤ 0.029 acres	> 1,300 to 130,000 ft <sup>2</sup> > 0.029 to 2.9 acres	> 130,000 ft <sup>2</sup> > 2.9 acres	$ft^2 + 13$ $acres + 0.00029$
	Land treatment	≤ 27,000 ft <sup>2</sup> ≤ 0.62 acres	> 27,000 to 2.7 million ft <sup>2</sup> > 0.62 to 62 acres	> 2.7 million ft <sup>2</sup> > 62 acres	$ft^2 + 270$ $acres + 0.0062$

1 ton = 2,000 lb = 1 yd<sup>3</sup> = 4 drums = 200 gallons

\* Use area of land surface under pile, not surface area of pile.

PA Table 1b: WC Scores for Multiple Source Sites

WC Total	WC Score
> 0 to 100	18
> 100 to 10,000	32
> 10,000	100

## GROUND WATER PATHWAY GROUND WATER USE DESCRIPTION

### **Describe Ground Water Use Within 4-miles of the Site:**

**(Describe stratigraphy, information on aquifers, municipal and/or private wells)**

Emanuel County is located in the Coastal Plain province of Georgia. This province is characterized by a southeastward-thickening wedge of poorly consolidated sand, clay, and limestone of Late Cretaceous to Holocene age (Reference 6). This sedimentary sequence unconformably overlies Paleozoic crystalline rocks or lower Mesozoic sedimentary and igneous rocks (Reference 6). These formations include the following (from youngest to oldest): Barnwell, Lisbon-McBean, Upper Huber-Tallahatta, Baker Hill-Nanafalla, and Lower Huber-Ellenton (Reference 6).

The Barnwell formation (at the most 230 feet thick) consists of an ascending sequence of calcareous sand, thinly bedded fossiliferous limestone, well-laminated clay, and cross-bedded sand. The Lisbon-McBean formation consists of massive, gray-green glauconitic marl interlayered with calcareous, clayey quartz sand and fossiliferous limestone. The Upper Huber-Tallahatta formation consists of fine to medium, subangular to subrounded, well-sorted, clayey quartz sand and is approximately 140 feet thick in the area of the site (Reference 6).

The local aquifers in the area include the Jacksonian, Gordon, Dublin, and Midville. Ground water withdrawal wells for the city of Swainsboro are at a minimum of 200 feet in depth (Reference 7). Shallower ground water may be encountered in areas near the site, however, this ground water is not a primary source of drinking water.

### **Calculations for Drinking Water Populations Served by Ground Water:**

Distance Rings (miles)	Population Served By Private Wells	Population Served By City Water	Total Population Served by Ground Water
0 - 0.25	4	0	4
0.25 - 0.50	10	0	10
0.50 - 1.0	48	1799	1847
1.0 - 2.0	169	1799	1968
2.0 - 3.0	278	3597	3875
3.0 - 4.0	339	0	339

City of Swainsboro - 2877 connections  
Ave. # Persons / Household - 2.5      >      Total Population Served - 7192.5

# GROUND WATER PATHWAY CRITERIA LIST

SUSPECTED RELEASE	PRIMARY TARGETS
<p>Y N U e o n s k</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Are sources poorly contained?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is waste quantity particularly large?</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is precipitation heavy?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is the infiltration rate high?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is the site located in an area of karst terrain?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is the subsurface highly permeable or conductive?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is drinking water drawn from a shallow aquifer?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are suspected contaminants highly mobile in ground water?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest ground water contamination?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> SUSPECTED RELEASE?</p>	<p>Y N U e o n s k</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is any drinking water well nearby?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has any nearby drinking water well been closed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has any nearby drinking water user reported foul-tasting or foul-smelling water?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Does any nearby well have a large drawdown or high production rate?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is any drinking water well located between the site and other wells that are suspected to be exposed to a hazardous substance?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest contamination at a drinking water well?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does any drinking water well warrant sampling?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> PRIMARY TARGET(S) IDENTIFIED?</p>
<p>Summarize the rationale for Suspected Release (attach an additional page if necessary):</p> <p>Only a small area of soil contamination is known to exist. It is not suspected that a release to ground water has occurred.</p> <p>Ref. 3,4,5</p>	<p>Summarize the rationale for Primary Targets (attach an additional page if necessary):</p> <p>Since a release to ground water is not suspected no primary targets exist.</p>



# GROUND WATER PATHWAY SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Ground Water Pathway Criteria List, page 7)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Is the site located in karst terrain?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Depth to aquifer:	20 ft
Distance to the nearest drinking water well:	1320 ft

## LIKELIHOOD OF RELEASE

- SUSPECTED RELEASE:** If you suspect a release to ground water (see page 7), assign a score of 550. Use only column A for this pathway.
- NO SUSPECTED RELEASE:** If you do not suspect a release to ground water, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 500; otherwise, assign a score of 340. Use only column B for this pathway.

	A Suspected Release	B No Suspected Release	Reference
1. SUSPECTED RELEASE: If you suspect a release to ground water (see page 7), assign a score of 550. Use only column A for this pathway.	550		
2. NO SUSPECTED RELEASE: If you do not suspect a release to ground water, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 500; otherwise, assign a score of 340. Use only column B for this pathway.		500	3.4.5
LR =	550	500	

## TARGETS

- PRIMARY TARGET POPULATION:** Determine the number of people served by drinking water wells that you suspect have been exposed to a hazardous substance from the site (see Ground Water Pathway Criteria List, page 7).  
\_\_\_\_\_ people  $\times 10 =$
- SECONDARY TARGET POPULATION:** Determine the number of people served by drinking water wells that you do NOT suspect have been exposed to a hazardous substance from the site, and assign the total population score from PA Table 2.  
Are any wells part of a blended system? Yes ☒ No ☐  
If yes, attach a page to show apportionment calculations.  
See Page A.11
- NEAREST WELL:** If you have identified a primary target population for ground water, assign a score of 50; otherwise, assign the Nearest Well score from PA Table 2. If no drinking water wells exist within 4 miles, assign a score of zero.
- WELLHEAD PROTECTION AREA (WHPA):** If any source lies within or above a WHPA, or if you have identified any primary target well within a WHPA, assign a score of 20; assign 5 if neither condition holds but a WHPA is present within 4 miles; otherwise assign zero.
- RESOURCES**

	A Suspected Release	B No Suspected Release	Reference
3. PRIMARY TARGET POPULATION: Determine the number of people served by drinking water wells that you suspect have been exposed to a hazardous substance from the site (see Ground Water Pathway Criteria List, page 7). _____ people $\times 10 =$			1
4. SECONDARY TARGET POPULATION: Determine the number of people served by drinking water wells that you do NOT suspect have been exposed to a hazardous substance from the site, and assign the total population score from PA Table 2. Are any wells part of a blended system? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, attach a page to show apportionment calculations. See Page A.11		155	8
5. NEAREST WELL: If you have identified a primary target population for ground water, assign a score of 50; otherwise, assign the Nearest Well score from PA Table 2. If no drinking water wells exist within 4 miles, assign a score of zero.		20	10
6. WELLHEAD PROTECTION AREA (WHPA): If any source lies within or above a WHPA, or if you have identified any primary target well within a WHPA, assign a score of 20; assign 5 if neither condition holds but a WHPA is present within 4 miles; otherwise assign zero.		5	8
7. RESOURCES		5	10
T =		185	

## WASTE CHARACTERISTICS

- A.** If you have identified any primary target for ground water, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.
- B.** If you have NOT identified any primary target for ground water, assign the waste characteristics score calculated on page 4.

	A Suspected Release	B No Suspected Release
8. A. If you have identified any primary target for ground water, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.		
8. B. If you have NOT identified any primary target for ground water, assign the waste characteristics score calculated on page 4.		18
WC =		18

GROUND WATER PATHWAY SCORE:

$$\frac{LR \times T \times WC}{82.500}$$

(subject to a maximum of 100)

20.2

PA TABLE 2: VALUES FOR SECONDARY GROUND WATER TARGET POPULATIONS

PA Table 2a: Non-Karst Aquifers

Distance from Site	Population	Nearest Well (choose highest)	Population Served by Wells Within Distance Category										Population Value
			1 to 10	11 to 20	21 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	Greater than 100,000	
0 to 1/4 mile	4	20	1	2	5	16	52	163	521	1,633	5,214	16,325	1
> 1/4 to 1/2 mile	10	18	1	1	3	10	32	101	323	1,012	3,233	10,121	1
> 1/2 to 1 mile	1847	9	1	1	2	5	17	52	167	522	1,668	5,224	52
> 1 to 2 miles	1968	5	1	1	1	3	8	28	84	294	839	2,938	29
> 2 to 3 miles	3875	3	1	1	1	2	7	21	68	212	678	2,122	68
> 3 to 4 miles	339	2	1	1	1	1	4	13	42	131	417	1,308	4
Nearest Well -		20											Score - 155

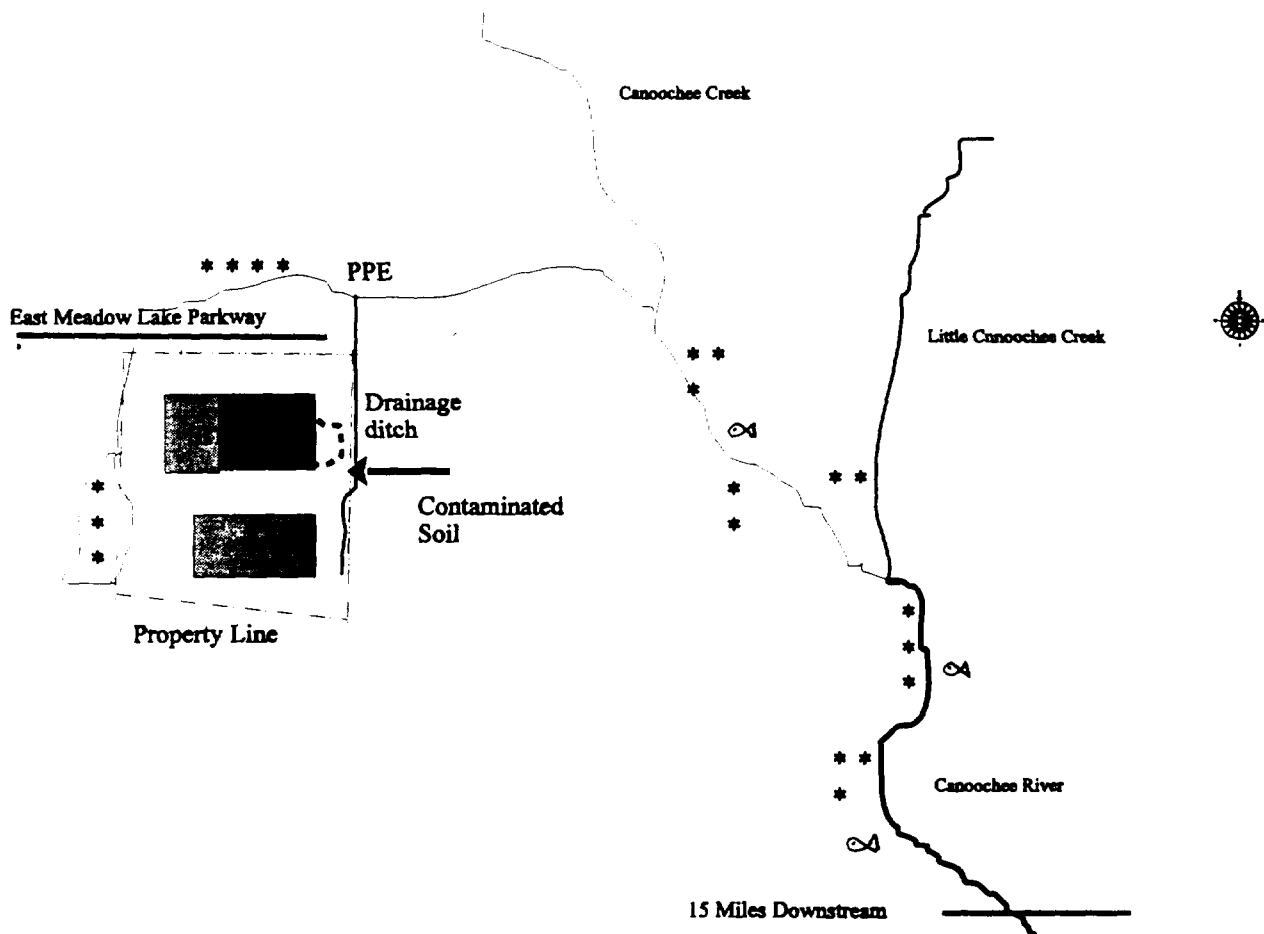
PA Table 2b: Karst Aquifers

Distance from Site	Population	Nearest Well (use 20 for karst)	Population Served by Wells Within Distance Category										Population Value
			1 to 10	11 to 20	21 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	Greater than 100,000	
0 to 1/4 mile		20	1	2	5	16	52	163	521	1,633	5,214	16,325	
> 1/4 to 1/2 mile		20	1	1	3	10	32	101	323	1,012	3,233	10,121	
> 1/2 to 1 mile		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 1 to 2 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 2 to 3 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 3 to 4 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
Nearest Well -													Score -

## SURFACE WATER PATHWAY MIGRATION ROUTE SKETCH

### Surface Water Migration Route Sketch:

(include runoff route, probable point of entry, 15-mile target distance limit, intakes, fisheries, and sensitive environments)



#### Legend

\*\*\* Wetlands

PPE Probable Point of Entry

☉ Fishery

Map Not To Scale

SURFACE WATER PATHWAY CRITERIA LIST	
SUSPECTED RELEASE	PRIMARY TARGETS
<p>Y N U e o n s k</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is surface water nearby?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is waste quantity particularly large?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is the drainage area large?</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is rainfall heavy?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Is the infiltration rate low?</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Are sources poorly contained or prone to runoff or flooding?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Is a runoff route well defined (e.g., ditch or channel leading to surface water)?</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Is vegetation stressed along the probable runoff route?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are sediments or water unnaturally discolored?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is wildlife unnaturally absent?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has deposition of waste into surface water been observed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is ground water discharge to surface water likely?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest surface water contamination?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> SUSPECTED RELEASE?</p>	<p>Y N U e o n s k</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Is any target nearby? If yes:</p> <p><input type="checkbox"/> Drinking water intake</p> <p><input checked="" type="checkbox"/> Fishery</p> <p><input checked="" type="checkbox"/> Sensitive environment</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has any intake, fishery, or recreational area been closed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest surface water contamination at or downstream of a target?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does any target warrant sampling? If yes:</p> <p><input type="checkbox"/> Drinking water intake</p> <p><input type="checkbox"/> Fishery</p> <p><input type="checkbox"/> Sensitive environment</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Other criteria? _____ ?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> PRIMARY INTAKE(S) IDENTIFIED?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> PRIMARY FISHERY(IES) IDENTIFIED?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED?</p>
<p>Summarize the rationale for Suspected Release (attach an additional page if necessary):</p> <p>No suspected release to surface water. Sample collected from ditch adjacent to source did not show contamination.</p> <p>Ref. 5</p>	<p>Summarize the rationale for Primary Targets (attach an additional page if necessary):</p> <p>No primary targets identified since a release is not suspected.</p>

# **SURFACE WATER PATHWAY LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT SCORESHEET**

Pathway Characteristics	
Do you suspect a release (see Surface Water Pathway Criteria List, page 11)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Distance to surface water:	<u>250</u> ft
Flood frequency:	<u>2500</u> yrs
What is the downstream distance to the nearest drinking water intake?	<u>715</u> miles
Nearest fishery? <u>3</u> miles	Nearest sensitive environment? <u>&lt; 0.25</u> miles

## **LIKELIHOOD OF RELEASE**

- SUSPECTED RELEASE:** If you suspect a release to surface water (see page 11), assign a score of 550. Use only column A for this pathway.
- NO SUSPECTED RELEASE:** If you do not suspect a release to surface water, use the table below to assign a score based on distance to surface water and flood frequency. Use only column B for this pathway.

Distance to surface water $\leq$ 2,500 feet	500
Distance to surface water $>$ 2,500 feet, and	
Site in annual or 10-year floodplain	500
Site in 100-year floodplain	400
Site in 500-year floodplain	300
Site outside 500-year floodplain	100

A Suspected Release (550)	B No Suspected Release
	500
550	500

Reference

LR =

5

## **DRINKING WATER THREAT TARGETS**

- Record the water body type, flow (if applicable), and number of people served by each drinking water intake within the target distance limit. If there is no drinking water intake within the target distance limit, factors 4, 5, and 6 each receive zero scores.

Intake Name	Water Body Type	Flow	People Served
		cfs	
		cfs	
		cfs	

- PRIMARY TARGET POPULATION:** If you suspect any drinking water intake listed above has been exposed to a hazardous substance from the site (see Surface Water Pathway Criteria List, page 11), list the intake name(s) and calculate the factor score based on the total population served.

\_\_\_\_\_ people  $\times$  10 =

- SECONDARY TARGET POPULATION:** Determine the number of people served by drinking water intakes that you do NOT suspect have been exposed to a hazardous substance from the site, and assign the total population score from PA Table 3.

Are any intakes part of a blended system? Yes ☐ No ☐  
If yes, attach a page to show apportionment calculations.

- NEAREST INTAKE:** If you have identified a primary target population for the drinking water threat (factor 4), assign a score of 50; otherwise, assign the Nearest Intake score from PA Table 3. If no drinking water intake exists within the target distance limit, assign a score of zero.

- RESOURCES**

T =

	0
	0
5	5
5	5

PA TABLE 3: VALUES FOR SECONDARY SURFACE WATER TARGET POPULATIONS

Surface Water Body Flow (see PA Table 4)	Population	Nearest Intake (choose highest)	Population Served by Intakes Within Flow Category											Population Value
			1 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	Greater than 1,000,000	
< 10 cfs	_____	20	2	5	10	52	163	521	1,633	5,214	16,325	52,136	163,248	_____
10 to 100 cfs	_____	2	1	1	2	5	16	52	163	521	1,633	5,214	16,325	_____
> 100 to 1,000 cfs	_____	1	0	0	1	1	2	5	16	52	163	521	1,633	_____
> 1,000 to 10,000 cfs	_____	0	0	0	0	0	1	1	2	5	16	52	163	_____
> 10,000 cfs or Great Lakes	_____	0	0	0	0	0	0	0	1	1	2	5	16	_____
3-mile Mixing Zone	_____	10	1	3	8	26	82	261	816	2,607	8,162	26,068	81,663	_____
Nearest Intake = _____			Score = _____											

PA TABLE 4: SURFACE WATER TYPE / FLOW CHARACTERISTICS WITH DILUTION WEIGHTS FOR SECONDARY SURFACE WATER SENSITIVE ENVIRONMENTS

Type of Surface Water Body		Dilution Weight
Water Body Type	OR Flow	
minimal stream	< 10 cfs	1
small to moderate stream	10 to 100 cfs	0.1
moderate to large stream	> 100 to 1,000 cfs	N/A
large stream to river	> 1,000 to 10,000 cfs	N/A
large river	> 10,000 cfs	N/A
3-mile mixing zone of quiet flowing streams or rivers	10 cfs or greater	N/A
coastal tidal water (harbors, sounds, bays, etc.), ocean, or Great Lakes	N/A	N/A

## 14

A	B
<b>Suspected Release</b>	<b>No Suspected Release</b>
(1442)	(1442, 1443 or 1444)
	500

LR -

**Abstract**

- | <i>Rehery Name</i> | <i>Water Body Type</i> | <i>Flow</i> |
|--------------------|------------------------|-------------|
|                    |                        | cts         |
|                    |                        | cts         |
|                    |                        | cts         |
|                    |                        | cts         |
|                    |                        | cts         |

- 

8. If you do not suspect a release, assign a Secondary Fisheries score from the table below using the lowest flow at any fishery within the target distance limit.

<i>Lowest Flow</i>	<i>Secondary Fisheries Score</i>
< 10 cfs	210
10 to 100 cfs	30
> 100 cfs, coastal tidal waters, oceans, or Great Lakes	12

Y. 200

30

12

30

**LIKELIHOOD OF RELEASE**

UR -

**Abstract**

11. Record the water body type and flow (if applicable) for each surface water sensitive environment within the target distance limit (see PA Tables 4 and 5). If there is no sensitive environment within the target distance limit, assign a Targets score of 0 at the bottom of the page.

12. **PRIMARY SENSITIVE ENVIRONMENTS:** If you suspect any sensitive environment listed above has been exposed to a hazardous substance from the site (see Surface Water Criteria List, page 11), assign a score of 300 and do not evaluate factor 13. List the primary sensitive environments:

---

13. **SECONDARY SENSITIVE ENVIRONMENTS:** If sensitive environments are present, but none is a primary sensitive environment, evaluate Secondary Sensitive Environments based on flow.

- A. For secondary sensitive environments on surface water bodies with flows of 100 cfs or less, assign scores as follows, and do not evaluate part B of this factor:

**Figure 1**

- T -



**PA TABLE 5: SURFACE WATER AND AIR PATHWAY SENSITIVE ENVIRONMENTS VALUES**

<b>Sensitive Environment</b>	<b>Assigned Value</b>
Critical habitat for Federally designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Ecologically important areas identified under the Coastal Zone Wilderness Act Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act Critical Areas identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes) National Monument (air pathway only) National Seashore Recreation Area National Lakeshore Recreation Area	100
Habitat known to be used by Federally designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Federal land designated for the protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical for the maintenance of fish/shellfish species within a river system, bay, or estuary Migratory pathways and feeding areas critical for the maintenance of anadromous fish species in a river system Terrestrial areas utilized for breeding by large or dense aggregations of vertebrate animals (air pathway) or semi-aquatic foragers (surface water pathway) National river reach designated as Recreational	75
Habitat known to be used by State designated endangered or threatened species Habitat known to be used by a species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federally designated Scenic or Wild River	50
State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Area Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
State designated areas for protection/maintenance of aquatic life under the Clean Water Act	5
Wetlands	See PA Table 6 (Surface Water Pathway) or PA Table 8 (Air Pathway)

**PA TABLE 6: SURFACE WATER PATHWAY  
WETLANDS FRONTAGE VALUES**

<b>Total Length of Wetlands</b>	<b>Assigned Value</b>
Less than 0.1 mile	0
0.1 to 1 mile	25
Greater than 1 to 2 miles	50
Greater than 2 to 3 miles	75
Greater than 3 to 4 miles	100
Greater than 4 to 8 miles	150
Greater than 8 to 12 miles	250
Greater than 12 to 16 miles	350
Greater than 16 to 20 miles	450
Greater than 20 miles	500

**SURFACE WATER PATHWAY (concluded)  
WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY**

WASTE CHARACTERISTICS	A	B
	<i>Suspected Release</i>	<i>No Suspected Release</i>
14. A. If you have identified any primary target for surface water (pages 12, 14, or 15), assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.  B. If you have NOT identified any primary target for surface water, assign the waste characteristics score calculated on page 4.	(100 or 32)	
	(100.00 or 18)	(100.00 or 18) 18
WC =		18

**SURFACE WATER PATHWAY THREAT SCORES**

Threat	<i>Likelihood of Release (LR) Score (from page 12)</i>	<i>Targets (T) Score (pages 12, 14, 15)</i>	<i>Pathway Waste Characteristics (WC) Score (determined above)</i>	<i>Threat Score LR x T x WC / 82,500</i>
Drinking Water	500	5	18	<small>Indicates to a maximum of 1000</small> .5
Human Food Chain	500	30	18	<small>Indicates to a maximum of 1000</small> 3.3
Environmental	500	50	18	<small>Indicates to a maximum of 1000</small> 5.5

**SURFACE WATER PATHWAY SCORE**  
(Drinking Water Threat + Human Food Chain Threat + Environmental Threat)

<small>Indicates to a maximum of 1000</small> 9.3
--

# SOIL EXPOSURE PATHWAY CRITERIA LIST

SUSPECTED CONTAMINATION	RESIDENT POPULATION
Surficial contamination can generally be assumed.	<p>Y N U e o n s k</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is any residence, school, or daycare facility on or within 200 feet of an area of suspected contamination?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is any residence, school, or daycare facility located on adjacent land previously owned or leased by the site owner/operator?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Is there a migration route that might spread hazardous substances near residences, schools, or daycare facilities?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Have onsite or adjacent residents or students reported adverse health effects, exclusive of apparent drinking water or air contamination problems?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does any neighboring property warrant sampling?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> RESIDENT POPULATION IDENTIFIED?</p>

Summarize the rationale for Resident Population (attach an additional page if necessary):

Approximately 16 workers on-site. No residences school, or day care within 200 feet.

## SOIL EXPOSURE PATHWAY SCORESHEET

Pathway Characteristics		
Do any people live on or within 200 ft of areas of suspected contamination?	Yes	No <input checked="" type="checkbox"/>
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination?	Yes	No <input checked="" type="checkbox"/>
Is the facility active? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, estimate the number of workers: <u>112</u>		

## LIKELIHOOD OF EXPOSURE

1. SUSPECTED CONTAMINATION: Surficial contamination can generally be assumed, and a score of 550 assigned. Assign zero only if the absence of surficial contamination can be confidently demonstrated.

LE =

Suspected Contamination
550

Reference

3.4.5

## RESIDENT POPULATION THREAT TARGETS

2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or daycare on or within 200 feet of areas of suspected contamination (see Soil Exposure Pathway Criteria List, page 18).

0 people x 10 =

3. RESIDENT INDIVIDUAL: If you have identified a resident population (factor 2), assign a score of 50; otherwise, assign a score of 0.

4. WORKERS: Use the following table to assign a score based on the total number of workers at the facility and nearby facilities with suspected contamination:

Number of Workers	Score
0	0
1 to 100	5
101 to 1,000	10
> 1,000	15

5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Use PA Table 7 to assign a value for each terrestrial sensitive environment on an area of suspected contamination:

Terrestrial Sensitive Environment Type	Value

Sum =

## 6. RESOURCES

T =

## WASTE CHARACTERISTICS

7. Assign the waste characteristics score calculated on page 4.

WC =

(MAX. 25 = 10)

18

## RESIDENT POPULATION THREAT SCORE:

$$\frac{LE \times T \times WC}{82,500}$$

Resident Population Threat Score
1.2

## NEARBY POPULATION THREAT SCORE:

Nearby Population Threat Score
1

9

## SOIL EXPOSURE PATHWAY SCORE:

Resident Population Threat + Nearby Population Threat

Soil Exposure Pathway Score
2.2

**PA TABLE 7: SOIL EXPOSURE PATHWAY  
TERRESTRIAL SENSITIVE ENVIRONMENT VALUES**

<i>Terrestrial Sensitive Environment</i>	<i>Assigned Value</i>
Terrestrial critical habitat for Federally designated endangered or threatened species	100
National Park	
Designated Federal Wilderness Area	
National Monument	
Terrestrial habitat known to be used by Federally designated or proposed threatened or endangered species	75
National Preserve (terrestrial)	
National or State terrestrial Wildlife Refuge	
Federal land designated for protection of natural ecosystems	
Administratively proposed Federal Wilderness Area	
Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	
Terrestrial habitat used by State designated endangered or threatened species	50
Terrestrial habitat used by species under review for Federal designated endangered or threatened status	
State lands designated for wildlife or game management	25
State designated Natural Areas	
Particular areas, relatively small in size, important to maintenance of unique biotic communities	

AIR PATHWAY CRITERIA LIST	
SUSPECTED RELEASE	PRIMARY TARGETS
<p>Y N U e o n s k</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are odors currently reported?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Has release of a hazardous substance to the air been directly observed?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are there reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Does analytical or circumstantial evidence suggest a release to the air?</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Other criteria? _____</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> SUSPECTED RELEASE?</p>	<p>If you suspect a release to air, evaluate all populations and sensitive environments within 1/4 mile (including those onsite) as primary targets.</p>
<p>Summarize the rationale for Suspected Release (attach an additional page if necessary):</p> <p style="text-align: center;">No release to air is suspected.</p>	

# AIR PATHWAY SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Air Pathway Criteria List, page 21)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Distance to the nearest individual:	<u>30</u> ft

## LIKELIHOOD OF RELEASE

- SUSPECTED RELEASE:** If you suspect a release to air (see page 21), assign a score of 550. Use only column A for this pathway.
- NO SUSPECTED RELEASE:** If you do not suspect a release to air, assign a score of 500. Use only column B for this pathway.

	A	B	Reference
	Suspected Release (1000)	No Suspected Release (500)	
LR =		500	10

## TARGETS

- PRIMARY TARGET POPULATION:** Determine the number of people subject to exposure from a suspected release of hazardous substances to the air.  
\_\_\_\_\_ people  $\times 10 =$
- SECONDARY TARGET POPULATION:** Determine the number of people not suspected to be exposed to a release to air, and assign the total population score using PA Table 8.
- NEAREST INDIVIDUAL:** If you have identified any Primary Target Population for the air pathway, assign a score of 50; otherwise, assign the Nearest Individual score from PA Table 8.
- PRIMARY SENSITIVE ENVIRONMENTS:** Sum the sensitive environment values (PA Table 5) and wetland acreage values (PA Table 9) for environments subject to exposure from a suspected release to the air.

Sensitive Environment Type	Value

	A	B	Reference
	Suspected Release (1000)	No Suspected Release (500)	
Sum =			
7. SECONDARY SENSITIVE ENVIRONMENTS: Use PA Table 10 to determine the score for secondary sensitive environments.		.76	11
8. RESOURCES		5	
T =		32.76	

## WASTE CHARACTERISTICS

- A. If you have identified any Primary Target for the air pathway, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.
- B. If you have NOT identified any Primary Target for the air pathway, assign the waste characteristics score calculated on page 4.

	A	B	Reference
	Suspected Release (1000)	No Suspected Release (500)	
WC =		18	

## AIR PATHWAY SCORE:

$$\frac{LR \times T \times WC}{82,500}$$

Score is a maximum of 100
<u>3.6</u>

PA TABLE 8: VALUES FOR SECONDARY AIR TARGET POPULATIONS

Distance from Site	Population	Nearest Individual (choose highest)	Population Within Distance Category													Population Value
			1 to 10	11 to 20	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	Greater than 1,000,000		
Onsite	116	20	1	2	5	16	52	163	521	1,633	5,214	16,325	52,136	163,246	2	
> 0 to 1/4 mile	8	20	1	1	1	4	13	41	130	408	1,303	4,081	13,034	40,811	1	
> 1/4 to 1/2 mile	76	2	0	0	1	1	3	9	28	88	282	882	2,815	8,815	1	
> 1/2 to 1 mile	552	1	0	0	0	1	1	3	8	26	83	261	834	2,612	1	
> 1 to 2 miles	2773	0	0	0	0	0	1	1	3	8	27	83	266	833	1	
> 2 to 3 miles	2606	0	0	0	0	0	1	1	1	4	12	38	120	378	1	
> 3 to 4 miles	746	0	0	0	0	0	0	1	1	2	7	23	73	229	0	
Nearest Individual =		20	Score =													7

PA TABLE 9: AIR PATHWAY VALUES FOR WETLAND AREA

Wetland Area	Assigned Value
Less than 1 acre	0
1 to 50 acres	25
Greater than 50 to 100 acres	75
Greater than 100 to 150 acres	125
Greater than 150 to 200 acres	175
Greater than 200 to 300 acres	250
Greater than 300 to 400 acres	350
Greater than 400 to 500 acres	450
Greater than 500 acres	500

PA TABLE 10: DISTANCE WEIGHTS AND CALCULATIONS FOR AIR PATHWAY SECONDARY SENSITIVE ENVIRONMENTS

	Distance	Sensitive Environment Type and Value (from PA Table 6 or 9)		Product
Distance	Weight			
Onsite	0.10	x		
		x		
0-1/4 mi	0.025	x	wetland (0)	0
		x	wetland (25)	.625
		x		
1/4-1/2mi	0.0064	x	wetland (25)	.135
		x		
		x		
		x		
Total Environments Score =				.76



## SITE SCORE CALCULATION

	S	S <sup>2</sup>
GROUND WATER PATHWAY SCORE (S <sub>gw</sub> ):	20.2	408.04
SURFACE WATER PATHWAY SCORE (S <sub>sw</sub> ):	9.3	86.49
SOIL EXPOSURE PATHWAY SCORE (S <sub>s</sub> ):	2.2	4.84
AIR PATHWAY SCORE (S <sub>a</sub> ):	3.6	12.96
SITE SCORE:	$\sqrt{\frac{S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2}{4}}$	
		11.3

## SUMMARY

	YES	NO
1. Is there a high possibility of a threat to any nearby drinking water well(s) by migration of a hazardous substance in ground water?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A. If yes, identify the well(s).		
B. If yes, how many people are served by the threatened well(s)?		
2. Is there a high possibility of a threat to any of the following by hazardous substance migration in surface water?		
A. Drinking water intake	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B. Fishery	<input type="checkbox"/>	<input checked="" type="checkbox"/>
C. Sensitive environment (wetland, critical habitat, others)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
D. If yes, identify the target(s).		
3. Is there a high possibility of an area of surficial contamination within 200 feet of any residence, school, or daycare facility?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If yes, identify the property(ies) and estimate the associated population(s).		
4. Are there public health concerns at this site that are not addressed by PA scoring considerations? If yes, explain:	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**OVERSIZED**

**DOCUMENT**



LAW ENVIRONMENTAL, INC.

112 TOWNPARK DRIVE  
KENNESAW, GEORGIA 30144-5569  
404-421-3400

October 20, 1989

RECEIVED

OCT 23 1989

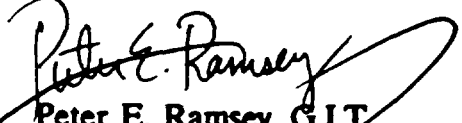
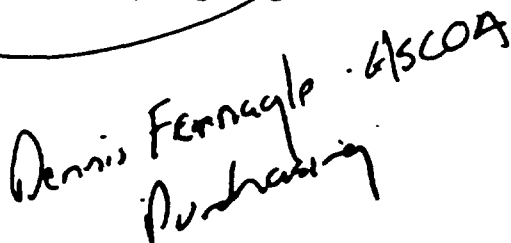
ASCOA  
Human ResourcesASCOA Fire Systems  
1000 East Edgerton Road  
Broadview Heights, Ohio 44147Attention: Mr. Jack J. Gullo, Jr.  
Director of Human ResourcesSubject: Phase I Environmental Assessment Report  
Automatic Sprinkler Corporation of America Fire Systems  
Swainsboro, Georgia Facility  
Law Environmental, Inc. Job No. 55-9691.03

Dear Mr. Gullo:

Law Environmental is pleased to submit the Phase I Environmental Assessment Report for the Automatic Sprinkler Corporation of America (ASCOA) Fire Systems facility in Swainsboro, Georgia. This work was authorized by the signing of our Proposal Acceptance Sheet by Mr. Dennis Fernengel on September 11, 1989. This report describes the purpose and scope of the Phase I Assessment and presents our findings and conclusions.

We appreciate the opportunity to provide these services to ASCOA and look forward to being of continued service. When you have had the opportunity to review this report, please call us so that we may discuss the findings with you and any questions you may have. We would also be pleased to assist you in developing a scope of work for the next phase of assessment.

Sincerely,

  
Peter E. Ramsey, G.I.T.  
Project Hydrogeologist  
A. David Alcott, P.E.  
Principal Engineer  
Dennis Fernengel - ASCOA  
Purchasing

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## **1.0 PROJECT BACKGROUND**

ASCOA Fire Systems operates a fire control device manufacturing facility in Swainsboro, Georgia (Figure 1). In a letter addressed to Mr. Thomas Holmes of Law Environmental, dated June 7, 1989, ASCOA identified several areas of potential environmental concern at the subject facility and requested a proposal for a phased environmental assessment of these areas. On June 21, a site reconnaissance was performed by Mr. Mark Parker, a Law Environmental senior professional. Subsequently, a proposal for a Phase I (Nature and Classification) Environmental Site Assessment was submitted on June 23. Additional analyses for several samples beyond those outlined in the proposal were requested during a phone conversation on August 8 with Mr. Dennis Fernengel. On September 11, Law Environmental was retained to implement the Phase I Assessment by Mr. Fernengel's signature of our Proposal Acceptance Sheet.

## **2.0 SCOPE OF WORK**

The purpose of this Phase I Environmental Assessment was to obtain data with which to characterize the nature and classification of environmental contamination at the identified areas of concern. The scope of work included the sampling of potentially contaminated surficial soils at 18 pre-selected locations (Figure 2). Specific analyses performed on the soils were selected based on discussions between Law Environmental and ASCOA. Two background samples were also collected and analyzed to provide data for comparison with data from analyses of the 18 samples collected from the areas of concern. Analyses of the surficial soil samples provide data which may be used to evaluate the impact of past facility operations and releases. Bottom sediment samples were collected from areas of the swamp

for analyses to provide data to assist in evaluating the potential impact on water quality which ultimately discharges from the site.

### **3.0 SITE DESCRIPTION**

The subject site is located in the southern, industrial portion of Swainsboro, Georgia. The site is bounded by East Meadow Lake Parkway to the north, the former PTR plastic extrusion plant on the west, George J. Meyer Manufacturing on the east and two abandoned lots to the south (Figure 2). The facility consists of two sections, each containing a process (manufacturing) building and a number of auxiliary structures. The main buildings are of mixed construction (concrete block, brick and steel frame) and have plan floor areas of approximately 40,000 square feet each.

The site slopes gently down toward a low swampy area near the center of the site, between the two manufacturing areas. The swamp receives surface run-off from most of the site and direct effluent discharge from caustic and acid wastes cleaning operations and from testing areas. A 24-inch culvert located in the center of the site drains the swamp to the north, beneath Meadow Lake Parkway, where it empties into a small tributary of Canoochee Creek. At the time of the site reconnaissance on June 21, 1989, a slight oily film was observed floating on the water exiting the culvert. A small drainage ditch extending along the eastern border of the site also drains the site to the north.

We understand ASCOA manufactures an assortment of fire control devices. The manufacturing processes include the cutting, milling and painting of metal sprinkler parts. Waste materials generated at the facility include cutting oils (coolants), hydraulic fluids,

caustic and acid wash solutions, and small amounts of solvents and painting wastes. Past practices at the facility have resulted in the release of these waste materials to the ground surface and to the swamp.

#### **4.0 SOIL SAMPLING**

Soil samples were collected from 20 pre-determined locations (Figure 2). Samples of potentially contaminated surficial soils were collected from 18 specified locations. Background samples were collected at two locations, numbers 19 and 20. The soil samples were collected from the surface to a maximum depth of 1 foot, following the general procedures outlined in the proposal. Detailed descriptions of the field soil sampling and quality assurance/quality control procedures are presented in Appendix A.

The soil samples were preserved on ice and taken to Law Environmental National Laboratories in Kennesaw, Georgia for analysis. The list of samples by numbered location, sample type and specific analyses is presented on Table 1. The list includes both the originally proposed and additional requested analyses. A list of the analyzed parameters and associated approved EPA methodologies is shown on Table 2.

#### **5.0 SUMMARY OF ANALYTICAL RESULTS**

The laboratory analytical results for the collected soil samples are presented in Appendix B. A summary of the analytical results is presented on Table 3. Figures 3 and 4 illustrate the concentration of TPH and metals, respectively, detected in the analyzed soils. The results are described in the following paragraphs.



- Sample 1    ☐    Sample of stained soil adjacent to compressor building pad.  
                  ☐    Analyzed for TPH.  
                  ☒    Detected concentration of TPH of 4300 mg/kg.
- Sample 2    ☐    Composite sample of stained soil adjacent to waste hydraulic oil and  
    metal chip storage area.  
                  ☐    Analyzed for TPH, metals and PCB's.  
                  ☒    Detected concentration of TPH of 12,000 mg/kg; elevated levels of  
    copper, lead and zinc; PCBs not detected.
- Sample 3    ☐    Sample of stained soil adjacent to drive-way in rear of facility  
    (downgradient from waste hydraulic oil and metal chip storage area).  
                  ☐    Analyzed for TPH and metals.  
                  ☒    Detected concentration of TPH of 210 mg/kg; elevated levels of  
    copper and lead.
- Sample 4    ☐    Sample of stained soil across drive-way in rear of facility (further  
    downgradient from waste hydraulic oil and metal chip storage area).  
                  ☐    Analyzed for TPH.  
                  ☒    Detected concentration of TPH of 660 mg/kg.
- Sample 5    ☐    Composite sample of stained soil along fence in rear of hazardous  
    waste storage shed.  
                  ☒    Analyzed for TPH and metals.  
                  ☐    Detected concentration of TPH of 17,000 mg/kg; elevated levels of  
    copper, lead, nickel, zinc and tin.
- Sample 6    ☐    Composite sample of stained soil downgradient from former plastic  
    extrusions plant.  
                  ☒    Analyzed for TPH, metals, PCB's and BN's.  
                  ☐    Detected concentrations of TPH of 11,000 mg/kg; elevated levels of  
    zinc; PCBs not detected, tentatively identified base neutral compounds  
    heptadecane, 2,7,10-trimethyldodecane and tetradecane at very low  
    concentrations.
- Sample 7    ☐    Sample of soil/ash from behind the incinerator.  
                  ☐    Analyzed for metals.  
                  ☐    Detected elevated levels of cadmium, chromium, copper, lead, nickel,  
    zinc and tin.
- Samples 8    ☐    Samples of soils in the vicinity of potassium carbonate spill.  
   through 11 ☐    Analyzed for pH  
                  ☐    The pH ranged from 9.6 to 11 with the pH of 11 closest to the origin  
    of spill.
- Sample 12    ☐    Soil sample of solvent stain adjacent to manufacturing building.  
                  ☐    Analyzed for TPH, metals, VOC's and pH.

- ✓ o Detected concentration of TPH of 34,000 mg/kg; elevated levels of copper, lead and zinc; VOCs not detected; pH of 5.8.
- Sample 13
  - o Soil sample of compressor oil stain adjacent to manufacturing building Analyzed for TPH, metals, PCBs and pH.
  - ✓ o Detected concentrations of TPH of 9,200 mg/kg; elevated levels of chromium, copper, lead, nickel, zinc and tin; PCBs not detected; pH of 5.6.
- Sample 14
  - o Soil sample of possible waste solvent spill behind hazardous waste storage shed.
  - o Analyzed for TPH, VOC's and pH.
  - o Detected concentration of TPH of 21.6 mg/kg; VOC's not detected; pH of 6.0.
- Sample 15
  - o Sediment sample from swamp downgradient from the former plastic extrusions plant and downgradient from the location of sample 6.
  - ✓ o Analyzed for TPH.
  - o Detected concentration of TPH of 17,000 mg/kg.
- Sample 16
  - o Sediment sample from swamp behind incinerator.
  - o Analyzed for metals and VOC's.
  - o Detected elevated levels of cadmium, chromium, copper, lead, nickel, zinc and tin; acetone detected at a low concentration; remaining VOC's not detected.
- Sample 17
  - o Sediment sample from swamp near discharge from caustic and acid washes.
  - o Analyzed for pH.
  - o pH of 10.
- Sample 18
  - o Sediment sample from swamp near 24-inch culvert.
  - o Analyzed for metals, VOC's, PCB's, BN's, oil and grease and pH.
  - o Detected low levels of chromium, copper, lead and zinc; VOC's not detected; PCB's not detected; BN's not detected; oil and grease not detected; pH of 6.3.
- Sample 19
  - o Background soil sample upgradient of site.
  - o Analyzed for metals and pH.
  - o Detected copper, lead and zinc; cadmium, chromium, nickel and tin non-detected; pH of 5.1.
- Sample 20
  - o Background sediment sample from swamp.
  - o Analyzed for metals and pH.
  - o Detected moderate levels of chromium, copper, lead, nickel and zinc; cadmium and tin non-detected; pH of 5.6.

## CONCLUSIONS

The analyses of the soil and sediment samples collected during this phase of study indicate areas of potential concern associated with:

- o high levels of total petroleum hydrocarbons and
- o elevated levels of metals

There appears to be lesser concern, if any, associated with the analyses for other constituents. PCBs were not detected in the analyzed samples. None of the samples for which pH was determined indicated an impact by facility operations or releases sufficient for the soils to be classified as hazardous by characteristic. However, the soil sample collected from just downgradient from the potassium carbonate mixing area and the bottom sediment sample from the swamp area just beyond the outfall of the discharge for caustic and acid washes both had very elevated pH values (10 and 11, respectively). With the exception of acetone (at a low concentration in one of the four samples which were analyzed for volatile organic compounds), volatile organic compounds were not detected.

Recent discussions with Georgia Environmental Protection Division (EPD) personnel concerning cleanup criteria for a spill or release of petroleum-derived products indicate that their present guidelines do not incorporate a specific concentration of TPH in soil above which cleanup is required. Determinations of cleanup requirements, if any, have been made on a site specific basis. However, draft guidelines (June, 1989) for target cleanup concentrations for underground storage tank releases are 100 mg/kg TPH for diesel, kerosene, etc. and 10 mg/kg Total BTEX for gasoline, aviation fuel, etc. Regulations in several other states in this region (EPA Region IV) already require cleanup activities for

concentrations of TPH above 100 mg/kg and this level has been used as a general guideline for cleanup in Georgia at sites not under specific EPD administrative or consent orders.

The analytical results for total petroleum hydrocarbon in soil are illustrated on Figure 3. These concentrations are generally at levels well above draft EPD guidance requiring excavation when associated with releases from underground storage tanks. Considering a wider application of this guidance, most of the soils sampled as a part of this study would require excavation and off-site disposal in a licensed landfill. Additionally, should EPD address the question of remediation of stained areas, we anticipate that some additional determination of the potential for stained soils to contain other constituents, like organic compounds, would be requested.

The analytical results for detected metals in soil are illustrated on Figure 4. Elevated levels of metals in soil are of concern due both to their potential toxicity and to their potential impact on surface and ground-water quality. Total metals analyses were performed on eleven samples as a part of this study. When considering the need for remediation, several regulatory criteria may be considered. If the concentration of the metals in soil are such that the soils fail an EP Toxicity test, the soil is considered a hazardous waste by characteristic. RCRA guidelines are also being developed which list proposed concentrations of many compounds, including total metals, which may be considered as "action levels" for triggering corrective measures.

Considering these criteria, the samples (7 and 16) collected from behind the incinerator contain several metals at concentrations which are likely toxic. This classification would

require their excavation and disposal as a hazardous waste. The compressor oil stain sample (13) contains at least lead at a concentration which is also probably toxic to an extent to require the soil to be classified as hazardous. Elevated levels in lead and copper from the stained areas at sample locations 2 (the waste hydraulic oil and metal chip storage) and 5 (adjacent to the hazardous waste storage shed) may also render these soils to be toxic and subject to excavation and disposal.

None of the sampled soils would appear to be of environmental concern associated with their analyses for PCBs, volatile organic compounds, base neutrals or pH.

## TABLES

TABLE 1  
SAMPLING LOCATIONS AND ANALYSES  
ASCOA  
SWAINSBORO, GEORGIA  
LAW ENVIRONMENTAL JOB NO. 55-9691

MAP KEY	SAMPLE TYPE	ANALYSES *					OIL & GREASE		pH
		TPH	METALS	VOC	PCB	BN			
1	SOIL	X							
2	COMPOSITE SOIL	X	X		X				
3	SOIL	X	O						
4	SOIL	X							
5	COMPOSITE SOIL	X	O						
6	COMPOSITE SOIL	X	O		O	X			
7	SOIL/ASH		X						
8	SOIL								X
9	SOIL								X
10	SOIL								X
11	SOIL								X
12	SOIL	O	O	X					O
13	SOIL	X	O		O				O
14	SOIL	O		X					O
15	SEDIMENT	X							
16	SEDIMENT		X	O					
17	SEDIMENT								X
18	SEDIMENT		X	X	X	X	O		X
19	SOIL		X						X
20	SEDIMENT		X						X
TRIP BLANK	WATER			X					

Notes: Explanation of abbreviated analyses and  
corresponding EPA Approved methods shown on Table 1

\* 'X' -- proposed analysis 6/23/89

'O' -- requested analysis 8/7/89

TABLE 2  
 SAMPLED PARAMETERS AND EPA  
 METHODS OF DETECTION  
 ASCOA  
 SWAINSBORO, GEORGIA  
 LAW ENVIRONMENTAL JOB NO. 55-9691

ABBREVIATION		ANALYZED PARAMETERS	APPROVED EPA METHOD OF DETECTION
TPH	--->	TOTAL PETROLEUM HYDROCARBONS (by Infrared)	418.1
METALS	--->	CADMIUM	7130
		CHROMIUM	7190
		COPPER	7210
		LEAD	7420
		NICKEL	7520
		ZINC	7950
		TIN	282.2
VOC	--->	VOLATILE ORGANIC COMPOUNDS	8240
PCB	--->	POLYCHLORINATED BIPHENYLS	8080
BN	--->	BASE/NEUTRALS EXTRACTABLE ORGANICS	8270
		OIL AND GREASE	9071
		pH	9040



TABLE 3  
SUMMARY OF ANALYTICAL RESULTS  
SOIL SAMPLES  
ASCOA  
SWAINSBORO, GEORGIA  
LAW ENVIRONMENTAL JOB NO. 55-9691

PARAMETERS	BACKGROUND SAMPLES		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
	S-19	S-20										
OIL AND GREASE	--	--	--	--	--	--	--	--	--	--	--	--
pH	5.1	5.6	--	--	--	--	--	--	--	9.6	10	7.9

Notes: (1) Only constituents that  
appeared in one or more  
analysis shown  
(2) [ ] Estimated Concentration  
(3) -- Not Analyzed  
(4) ND Not Detected  
(5) \* Estimated Concentration for  
tentatively identified compounds

TABLE 3  
SUMMARY OF ANALYTICAL RESULTS  
SOIL SAMPLES  
ASCOA  
SWAINSBORO, GEORGIA  
LAW ENVIRONMENTAL JOB NO. 55-9691

PARAMETERS	BACKGROUND SAMPLES		S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18	TRIP
	S-19	S-20									BLANK
-----											
H Y D R O C A R B O N S											
-----											
TOTAL PETROLEUM HYDROCARBONS (mg/kg)	--	--	--	34000	9200	21.6	17000	--	--	--	--
M E T A L S											
-----											
CADMIUM (mg/kg)	ND	ND	--	ND	ND	--	--	42	--	ND	--
CHROMIUM (mg/kg)	ND	36	--	12	38	--	--	510	--	15	--
COPPER (mg/kg)	3.1	140	--	230	6700	--	--	4700	--	36	--
LEAD (mg/kg)	28	63	--	83	3000	--	--	7500	--	50	--
NICKEL (mg/kg)	ND	4.6	--	6.4	84	--	--	140	--	7.5	--
ZINC (mg/kg)	51	93	--	230	740	--	--	5100	--	67	--
TIN (mg/kg)	ND	ND	--	ND	29	--	--	80	--	ND	--

TABLE 3  
SUMMARY OF ANALYTICAL RESULTS  
SOIL SAMPLES  
ASCOA  
SWAINSBORO, GEORGIA  
LAW ENVIRONMENTAL JOB NO. 55-9691

[illegible]

TABLE 3  
SUMMARY OF ANALYTICAL RESULTS  
SOIL SAMPLES  
ASCOA  
SWAINSBORO, GEORGIA  
LAW ENVIRONMENTAL JOB NO. 55-9691

PARAMETERS	BACKGROUND SAMPLES		S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18	TRIP BLANK
	S-19	S-20									
OIL AND GREASE	--	--	--	--	--	--	--	--	--	ND	--
pH	5.1	5.6	11	5.8	5.6	6.0	--	--	10	6.3	--

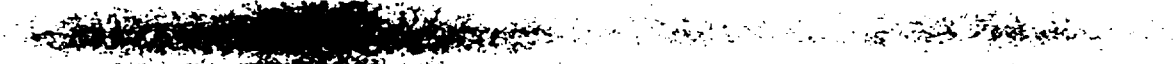
- Notes: (1) Only constituents that appeared in one or more analysis shown  
 (2) [ ] Estimated Concentration  
 (3) -- Not Analyzed  
 (4) ND Not Detected  
 (5) \* Estimated Concentration for tentatively identified compounds

TABLE 3  
SUMMARY OF ANALYTICAL RESULTS  
SOIL SAMPLES  
ASCOA  
SWAINSBORO, GEORGIA  
LAW ENVIRONMENTAL JOB NO. 55-9691

PARAMETERS	BACKGROUND SAMPLES		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
	S-19	S-20										
H Y D R O C A R B O N S												
-----												
TOTAL PETROLEUM HYDROCARBONS (mg/kg)	--	--	4300	12000	210	660	17000	11000	--	--	--	--
M E T A L S												
-----												
CADMIUM (mg/kg)	ND	ND	--	5.7	ND	--	2.0	ND	19	--	--	--
CHROMIUM (mg/kg)	ND	36	--	37	10	--	23	ND	4100	--	--	--
COPPER (mg/kg)	3.1	140	--	1900	150	--	4700	3.0	240	--	--	--
LEAD (mg/kg)	28	63	--	240	53	--	300	12	74000	--	--	--
NICKEL (mg/kg)	ND	4.6	--	30	4.8	--	33	ND	34	--	--	--
ZINC (mg/kg)	51	93	--	840	85	--	1700	180	4900	--	--	--
TIN (mg/kg)	ND	ND	--	68	ND	--	18	ND	26	--	--	--

TABLE 3  
SUMMARY OF ANALYTICAL RESULTS  
SOIL SAMPLES  
ASCOA  
SWAINSBORO, GEORGIA  
LAW ENVIRONMENTAL JOB NO. 55-9691

PARAMETERS	BACKGROUND SAMPLES		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
	S-19	S-20										
VOLATILE ORGANIC COMPOUNDS	--	--	--	--	--	--	--	--	--	--	--	--
ACETONE (ug/kg)	--	--	--	--	--	--	--	--	--	--	--	--
P C B's	--	--	--	ND	--	--	--	ND	--	--	--	--
BASE NEUTRALS	--	--	--	--	--	--	--	ND	--	--	--	--
HEPTADECANE (ug/kg)	--	--	--	--	--	--	--	1900 *	--	--	--	--
2,7,10-TRIMETHYLDODECANE (ug/kg)	--	--	--	--	--	--	--	2000 *	--	--	--	--
TETRADECANE (ug/kg)	--	--	--	--	--	--	--	2200 *	--	--	--	--



**FIGURES**



SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE  
SWAINSBORO, GEORGIA, 1971.

0 2000  
SCALE IN FEET

ASCOA FIRE SYSTEMS  
CLEVELAND, OHIO

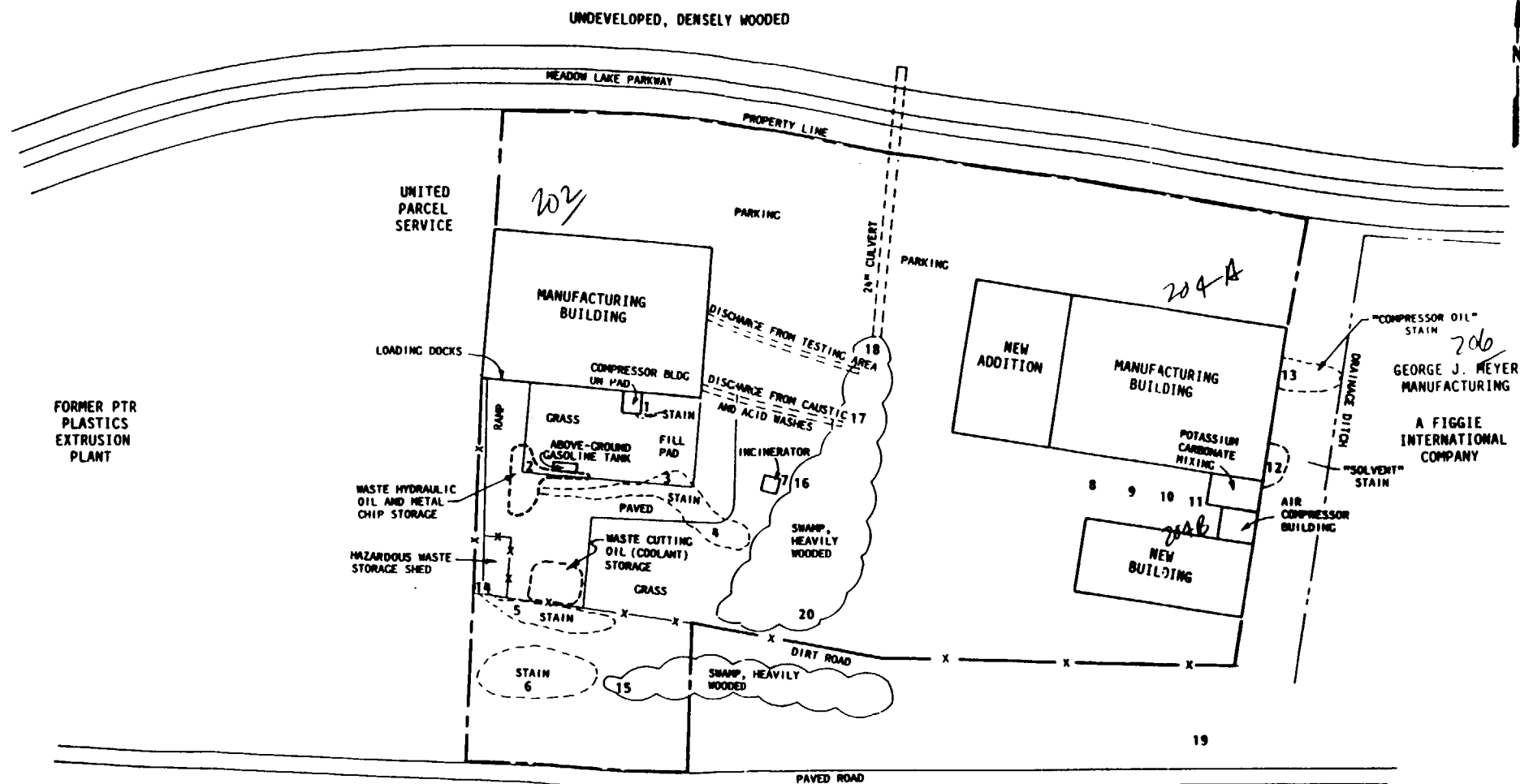


LAW ENVIRONMENTAL  
INC.

SITE LOCATION MAP  
SWAINSBORO, GEORGIA  
FACILITY

FIGURE 1





NOTE: APPROXIMATE SAMPLING LOCATIONS, SHOWN BY BOLD NUMBERS, ARE LISTED IN TABLE 1.

SOURCE: ENLARGED USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP OF SWAINSBORO, GEORGIA (1971); SITE PLAN PROVIDED BY ASCOA FIRE SYSTEMS; FIELD NOTES FROM 6-21-89 SITE VISIT.

ASCOA FIRE SYSTEMS  
CLEVELAND.



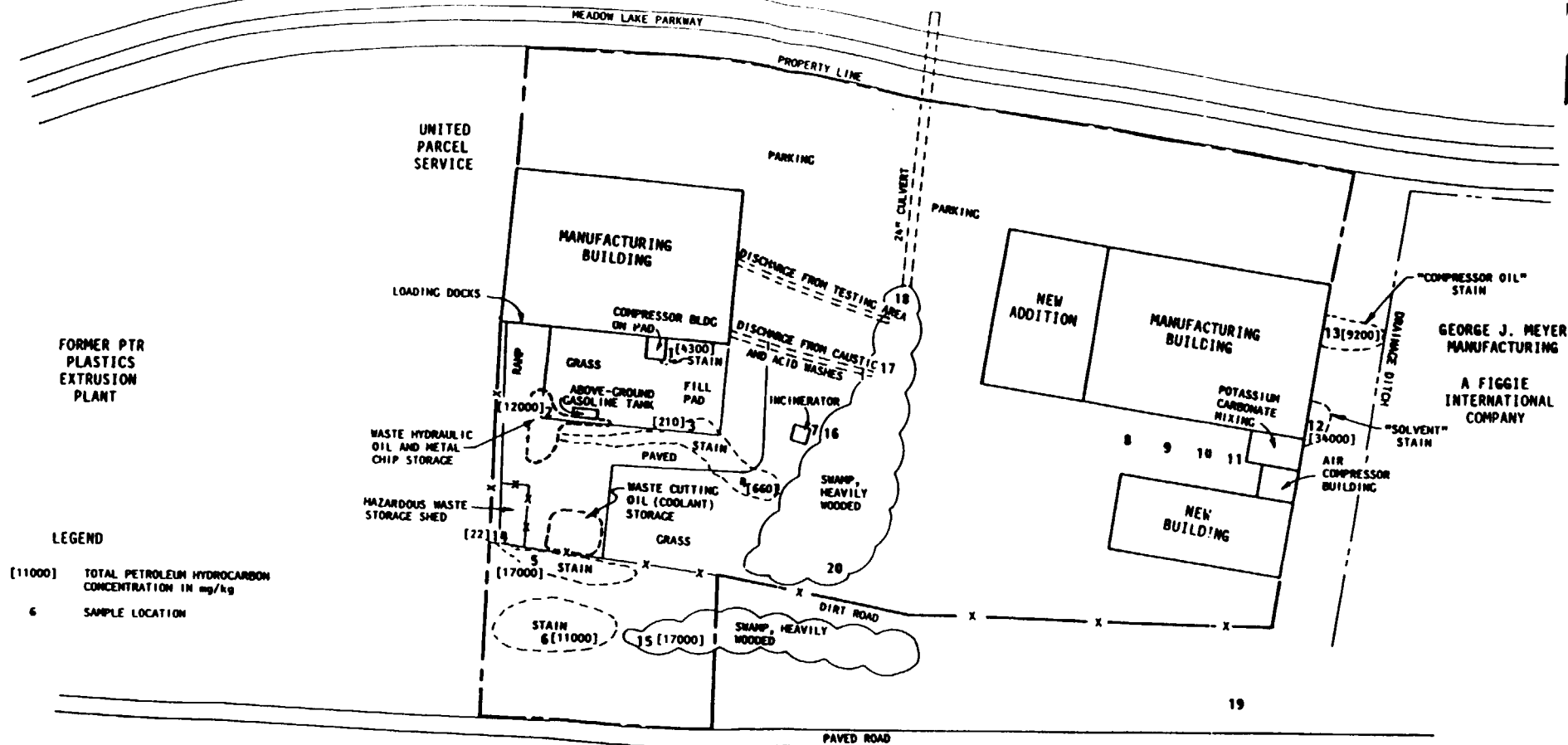
LAW ENVIRONMENTAL  
INC.

SCHEMATIC SITE PLAN  
SURFACE SOIL SAMPLING LOCATIONS

JOB NO. 55-9691

FIGURE 2

UNDEVELOPED, DENSELY WOODED



# LEGEND

[11000] TOTAL PETROLEUM HYDROCARBON CONCENTRATION IN mg/kg

6 SAMPLE LOCATION

NOTE: APPROXIMATE SAMPLING LOCATIONS, SHOWN BY BOLD NUMBERS, ARE LISTED IN TABLE 1.

SOURCE: ENLARGED USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP OF SHAWNEEBORO, GEORGIA (1971); SITE PLAN PROVIDED BY ASCOA FIRE SYSTEMS; FIELD NOTES FROM 6-21-89 SITE VISIT.

0 100 200  
APPROXIMATE SCALE IN FEET

ASCOA FIRE SYSTEMS  
CLEVELAND, OHIO



LAW ENVIRONMENTAL  
INC.

TOTAL PETROLEUM  
HYDROCARBONS  
IN SOILS

JOB NO. 55-9691

FIGURE 3

UNDEVELOPED, DENSELY WOODED

MEADOW LAKE PARKWAY

PROPERTY LINE

PARKING

PARKING

UNITED  
PARCEL  
SERVICE

Cd <2  
Cr 10  
Cu 150  
Pb 53  
Ni 5  
Zn 85  
Sn <5

LOADING DOCKS

Cd 5.7  
Cr 37  
Cu 1900  
Pb 240  
Ni 30  
Zn 840  
Sn 68

FORMER PTR  
PLASTICS  
EXTRUSION  
PLANT

WASTE HYDRAULIC  
OIL AND METAL  
CHIP STORAGE

HAZARDOUS WASTE  
STORAGE SHED

Cd 2  
Cr 23  
Cu 4700  
Pb 300  
Ni 33  
Zn 1700  
Sn 18

MANUFACTURING  
BUILDING

COMPRESSOR BLDG  
ON PAD

GRASS

ABOVE-GROUND  
GASOLINE TANK

FILL PAD

PAVED

WASTE CUTTING  
OIL (COOLANT)  
STORAGE

GRASS

DISCHARGE FROM TESTING AREA

DISCHARGE FROM CAUSTIC 17  
AND ACID WASHES

INCINERATOR

SWAMP, HEAVILY  
WOODED

DIRT ROAD

SWAMP, HEAVILY  
WOODED

PAVED ROAD

Cd <2  
Cr 15  
Cu 36  
Pb 50  
Ni 7.5  
Zn 67  
Sn <5

NEW  
ADDITION

MANUFACTURING  
BUILDING

POTASSIUM  
CARBONATE  
MIXING

NEW  
BUILDING

AIR  
COMPRESSOR  
BUILDING

"COMPRESSOR OIL"  
STAIN

GEORGE J. MEYER  
MANUFACTURING

A FIGGIE  
INTERNATIONAL  
COMPANY

"SOLVENT"  
STAIN

Cd <2  
Cr 12  
Cu 230  
Pb 83  
Ni 6.4  
Zn 230  
Sn <5

Cd <2  
Cr 38  
Cu 6700  
Pb 3000  
Ni 84  
Zn 740  
Sn 29

Cd 42  
Cr 510  
Cu 4700  
Pb 7500  
Ni 140  
Zn 5100  
Sn 80

Cd 19  
Cr 4100  
Cu 240  
Pb 74000  
Ni 34  
Zn 4900  
Sn 26

Cd <2  
Cr 36  
Cu 140  
Pb 63  
Ni 4.6  
Zn 93  
Sn <5

Cd <2  
Cr 4.6  
Cu 3.1  
Pb 28  
Ni <4  
Zn 51  
Sn <5

BACKGROUND

LEGEND

METALS CONCENTRATION (mg/kg)

Cd = CADMIUM  
Cr = CHROMIUM  
Cu = COPPER  
Pb = LEAD  
Ni = NICKEL  
Zn = ZINC  
Sn = TIN

NOTE: APPROXIMATE SAMPLING LOCATIONS, SHOWN BY  
BOLD NUMBERS, ARE LISTED IN TABLE 1.

SOURCE: ENLARGED USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE  
MAP OF SWAINSBORO, GEORGIA (1971); SITE PLAN PROVIDED  
BY ASCOA FIRE SYSTEMS; FIELD NOTES FROM 6-21-89 SITE VISIT.

0 100 200  
APPROXIMATE SCALE IN FEET

ASCOA FIRE SYSTEMS  
CLEVELAND, OHIO

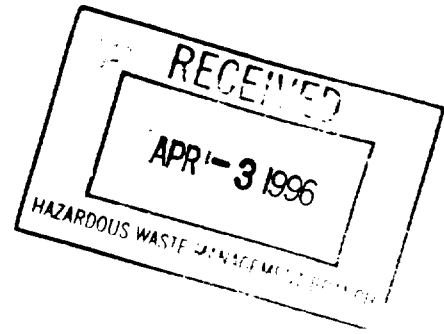


LAW ENVIRONMENTAL  
INC.

CONCENTRATION OF METALS  
IN SOILS

JOB NO. 55-9691

FIGURE 4



**204 EAST MEADOWLAKE PARKWAY SITE**  
**SWAINSBORO, GEORGIA**

**PHASE I ENVIRONMENTAL SITE ASSESSMENT**

**204 EAST MEADOWLAKE PARKWAY  
ASCOA FIRE SYSTEMS  
SWAINSBORO, GEORGIA**

Prepared for  
Figgie International  
4420 Sherwin Road  
Willoughby, Ohio 44094

October 1993

Prepared by  
EMCON Southeast  
435 Atlanta Technology Center  
1575 Northside Drive  
Atlanta, Georgia 30318-4211

Project 2183.003.93

Phase One Environmental Site Assessment  
204 East Meadowlake Parkway  
ASCOA Fire Systems  
Swainsboro, Georgia

The material and data in this report were prepared under the supervision and direction of the undersigned.

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Michael S. Hickman, E.I.T.  
Project Manager

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Date

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David S. Buchalter, P.E.  
Group Manager  
Environmental Services

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Date

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1.2 Site Setting	1
1.3 Previous Assessment	1
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3.2 Subsurface Geological Characterization	4
<b>4 SITE INSPECTION</b>	<b>5</b>
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## **LIMITATIONS**

## **FIGURES**

## **CONTENTS (Continued)**

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<b>APPENDIX B</b>	<b>SUPPORTING DOCUMENTS</b>
<b>APPENDIX C</b>	<b>PHOTOGRAPHS</b>



## **TABLES AND ILLUSTRATIONS**

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### **Figures**

- 1 Site Map
- 2 Parcel Map
- 3 Location Map
- 4 Topographic Map

# **1 INTRODUCTION**

---

## **1.1 Purpose**

The purpose of this study was to assess the potential for environmental impact or impairment on this site due to previous land use, site activity, or adjacent off-site activity.

## **1.2 Site Setting**

The site is located at 204 East Meadowlake Parkway in the 53rd Georgia Military District (GMD) of Swainsboro, Emanuel County, Georgia. The site is located to the southeast of the center of Swainsboro in an industrial district consisting of other manufacturing facilities, warehousing, and the local publicly-owned treatment works (POTW). This location is between East Meadowlake Parkway to the north, the 204 East Meadowlake Parkway Chemetron facility to the south, the 202 East Meadowlake Parkway former ASCOA facility to the west, and the 206 East Meadowlake Parkway former George J. Meyer Manufacturing facility to the east. Although both the ASCOA and Chemetron facilities have the same address, at the request of Figgie Properties, they are being treated as separate sites for the purposes of the environmental assessments.

## **1.3 Previous Assessment**

EMCON has received and reviewed two previous assessments conducted at this site. The first was conducted by Law Environmental, Inc. on October 20, 1989 and consists of sampling of surficial soils at seven locations on the site. The results of the soil sampling conducted on site revealed elevated levels of both total petroleum hydrocarbons (TPH) and several metals, including chromium, copper, lead, nickel, and zinc. During this survey, samples were collected from areas near the air compressor lines, the potassium carbonate mixing area, between the 204 ASCOA and 204 Chemetron buildings, and at the southeastern corner of the site. The levels of these contaminants ranged from 3.1 ppm to 6,700 ppm for the various total metals analyses conducted on site, and 9,200 ppm to 34,000 ppm for TPH.

The next assessment provided to EMCON was conducted by VERSAR, Inc. and was dated September 14, 1992. This report was conducted for both the 202 ASCOA and 204 ASCOA/Chemetron properties. This report consisted of a compliance audit of the then-

operating facility considering the storage of hazardous materials, air and water permitting, SARA Title III and Community Right-to-Know regulations, hazard communication standards, and other issues. The main concerns which remain from this report are the lack of a storm water permit for the site, the formulation of a RCRA contingency plan, air permitting for the paint booths, storage of drums in un-diked areas, storage of empty drums, the discharge of potassium carbonate to the environment, and contamination of surficial soils with both petroleum hydrocarbons and metals.

## **1.4 Scope of Work**

The investigative procedures in this Phase One Environmental Site Assessment consisted of a site reconnaissance, inventory of the types of businesses operating near the site, interviews of previous site managers, review of previously prepared reports, investigation into regulatory status of certain sites, review of aerial photographs and research into available U.S. Environmental Protection Agency (EPA) and Georgia Environmental Protection Division (EPD) site inventory data.

## **2 SITE BACKGROUND/OPERATING HISTORY**

---

### **2.1 Current Ownership**

At present the site is owned by Figgie Properties and is occupied by a skeleton staff. It was previously used by Automatic Sprinkler Corporation of America (ASCOA) as a manufacturing plant. A small amount of machinery still exists within the building, which we understand is used sparingly in the manufacture of fire control systems. A large number of various system components are stored at the western end of the building and are shipped to ASCOA's subsidiaries and clients.

### **2.2 Review of Aerial Photographs**

No photographs showing the site were available from the Georgia DOT aerial laboratory. Photographs reviewed in the Versar report indicated that the site was undeveloped in 1949, and that by 1969, the building now on site had been constructed. The addition of the western end of the building was not shown until the 1990 photograph.

### **2.3 History of Property Use**

The site was previously utilized by Automatic Sprinkler Corporation of America for the manufacturing of sprinkler system components. The types of manufacturing processes conducted at the site included machining of metal parts, cleaning of metal parts, painting, and coating. Involved with these processes were the usage of many different hazardous materials, including solvents, oils, greases, and paints. These processes still take place on site, but at a much smaller scale, and not on a regular basis.

Based on the information gathered to date, no known development of the property occurred prior to its development by ASCOA.

### **3 ENVIRONMENTAL SETTING**

---

#### **3.1 Surface Water Characteristics**

The topography of the site is such that surface water primarily flows to the west where it intersects a small swampy area. This area drains to the north to a culvert which traverses East Meadowlake Parkway and drains into a tributary of Canoochee Creek. During the time of the site visit, the area was in a drought, so no surface water was observed on the site or in the area immediately off-site.

In the swampy area we identified some black globules which may be oil from run-off at the site. According to the October 1989, Law Environmental report, this area was reported to receive surface runoff discharges from the potassium carbonate mixing area. In addition, the Law report indicated the presence of an oily sheen on surface water exiting the culvert to the north side of East Meadowlake Parkway.

#### **3.2 Subsurface Geological Characterization**

The site is located in the Coastal Plain Province of Georgia. This Province is characterized as a broad, very gently sloping plain that decreases in total relief towards Florida and coastal Georgia. This area is characterized by sands and coastal sedimentary rocks from the age when this area was ocean bottom or coastline.

According to mapping by the Georgia Geologic Survey, the rocks that occur in the site area belong to the Pine Barren region and consists primarily of sedimentary sand rocks. Overlying these rocks are coastal plain clays which are underlain by fine sands formed by weathering of sedimentary rocks. Fluvial and alluvial soils also occur in the area from stream deposits.

## **4 SITE INSPECTION**

---

### **4.1 Site Observations and Inquiries**

The site was visited on two separate occasions by Mike Hickman of EMCON, the first in June, 1993, and the second in July, 1993. During these two visits, Mr. Bill Ross of ASCOA provided an explanation of the previous use of the facility, and access to the site.

Contained on the site is a manufacturing building, air compressor shed, chemical mixing shed, and three compressed gas storage containers. The building on site consists of approximately 50,000 square feet. It is constructed of a steel infrastructure supported by a slab-on-grade foundation. The roof is supported by metal trusses and interior columns, and is constructed of metal. The building currently contains a paint line, computerized parts carousel, parts storage containers, a shipping area, and assembly areas. No machining equipment is housed within the facility other than small shop tools. Attached to the southeastern corner of the building are two small sheds. The one nearest the building houses potassium carbonate tanks, a parts polishing unit (vibratory type), and a mixing tank. The second shed contains air compressors which provide compressed air to both the 204 ASCOA and 204 Chemetron buildings. The three compressed gas storage containers are used for bulk storage of fire-fighting chemicals which are placed into smaller containers used in ASCOA Fire Systems products.

A reconnaissance of the remainder of the site indicated several stained areas, located primarily near the northeast and southeast corners of the building. These stains appear to be oils, solvents, or greases. Each of these areas were previously sampled by Law Environmental, indicating elevated levels of both metals and petroleum hydrocarbons.

## **4.2 AST/UST Systems and Pipelines**

### **4.2.1 On-Site ASTs/USTs**

No underground storage tanks (USTs) were known to exist on the site. Three above-ground storage tanks exist on site and are used for storage of compressed gases, as discussed earlier.

### **4.2.2 On-Site Product Pipelines**

No product pipelines are in use at the site; however, some waste water lines exist on site, extending from the front of the site to the southeastern corner of the building. These lines were used to pump waste water to the front of the building where it was discharged to a truck and transported to a treatment facility.

## **4.3 Transformers and PCB Equipment**

The transformers supplying power to this facility are pole-mounted and are at the northeastern corner of the 204 East Meadowlake Parkway Chemetron Fire Systems facility. A visual observation of these transformers indicated no signs of leakage from these units. Due to the apparent age of the buildings, it is possible that these transformers contain PCBs. In order to determine whether the dielectric fluid contains PCBs, these transformers must be tested.

## **4.4 On-Site Regulated Substance Identification/Inventory**

An inventory of regulated substances on site indicated usage of paints, oils, solvents, and metal finishing chemicals. These chemicals were stored in the small shed located nearest the southeastern corner of the building. The 55-gallon steel drums in the shed were stored upright and in direct contact with the concrete floor. The potassium carbonate tanks are made of thick plastic and are on individual pads separated from the concrete floor. Each of the plastic tanks were covered with loose-fitting lids which contained penetrations for gauging and mixing equipment.

## **4.5 Area Reconnaissance**

The area around the site is primarily developed with commercial and industrial properties, including a former ASCOA facility, former plastic extrusion plant, United Parcel Service distribution center, fire station, Enmark gasoline station, and a Goodyear tire store to the west; the Chemetron fire systems facility and undeveloped properties to the south; the former George J. Meyer facility, and a shirt manufacturer to the east; and other

undeveloped properties to the north. Further from these properties are primarily commercial and industrial areas, which include the Swainsboro Waste Water Treatment Plant, several motels, and retail shopping centers.

#### **4.6 Asbestos Containing Materials (ACMs)**

Based on a visual inspection of the facility by an inspector who completed and passed a certified asbestos inspection course, and the age of the facility, no potential asbestos-containing materials were identified in thermal system insulation, surfacing materials, or miscellaneous building materials at the facility.

#### **4.7 Utilities**

All major utilities are provided to the site by the City of Swainsboro and private utilities. The water and wastewater services are provided by the City of Swainsboro. Electricity to the site is provided by Georgia Power, and telephone service is from Southern Bell.



## **5 ENVIRONMENTAL/REGULATORY AGENCY INQUIRIES**

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### **5.1 Federal and State Regulatory Agencies**

#### **5.1.1 Regulatory Databases**

An environmental database report was provided for this site by Environmental Database, Inc. (EDI) of Littleton, Colorado. This report was produced by searching for facilities which were located within 1/2 mile from the center of the site. The lists reviewed are identified below:

- The National Priorities List (NPL). This list identifies the names and addresses of sites on the CERCLIS list which have been identified as posing the most threat to human health and the environment.
- The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list. This list identifies the names and addresses of facilities or sites that are subject to EPA regulations under the CERCLA.
- The Resource Conservation & Recovery Act Information System (RCRIS) list. This list identifies facilities that generate, transport, store or dispose of hazardous waste.
- The Facility Index System (FINDS) list. This list identifies facilities or sites that are subject to EPA or state regulations and is a compilation of many databases, including but not limited to, NPL, RCRA, CERCLA, Toxic Substances Control Act, Civil Enforcement Docket (legal database), Hazardous Waste Data Management System (HWDMS), Surface Impoundment Act (SIA), and Chemicals in Commerce Information System (CICIS).
- The Georgia Leaking Underground Storage Tank (LUST) list. This list identifies facilities that have reported a confirmed release from underground tanks operated at the facility.
- The National Pollution Discharge Elimination System (NPDES) list. This list identifies sites which hold discharge permits, and include treatment plants, manufacturing, and industrial facilities.

- The Georgia list of Active Permitted Landfill Sites. This list includes all operating landfills in the state.
- The Hazardous Materials Spill Report. This report identifies any suspected or confirmed spill of hazardous materials that is not covered under other agencies.
- The SARA Title III Toxic Release Inventory (TRI). This report identifies releases of toxic materials to land, water or air.

The following is the results of the database search. The full EDI report is included in the appendix.

a) National Priority List (NPL).

No facilities were listed in the report.

b) Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS).

Swainsboro Wastewater Treatment Plant  
Industrial Way

This facility was listed as No Further Action (NFA) planned by EPA in the database records. This NFA flag indicates that an assessment was conducted at the site which determined no further remedial action was required with regards to the site.

c) Resource Conservation and Recovery Act (RCRIS) List.

Automatic Sprinkler Corporation of America (ASCOA)  
202 Meadowlake Parkway

The database indicated that no RCRA violations had been reported and that the facility was a small quantity generator.

Swainsboro Wastewater Treatment Plant  
Industrial Way

The database indicated that no RCRA violations had been reported.

American Yard Products  
Electric Road

The database indicated that no RCRA violations had been reported.

d) Facility Index System (FINDS).

The following sites were listed on the FINDS database. No specific information about activities at these sites is provided in the database.

Swainsboro WWTP WPCBP  
Industrial Way

American Yard Products  
Electric Road

Farmers Mutual Exchange  
Meadow Lake Parkway

Automatic Sprinkler Corp. of America (ASCOA)  
202 E. Meadowlake Parkway

Reeves Construction  
U.S. Hwy 1

American Envirecycle  
10 S. Industrial Park

e) Leaking Underground Storage Tank (LUST) Listings.

United Parcel Service  
200 Meadow Lake Parkway

Bowman Transportation  
225 Industrial Way

Enmark/Interstate  
U.S. Highway 1 South

Ga. Power / Swainsboro Operating Headquarters  
U.S. Highway 1

f) National Pollution Discharge Elimination System (NPDES) Permits.

Swainsboro WPCP  
This database indicates that the permit expiration date is June 4, 1997.

g) Active, Permitted Landfill Sites.

No sites were listed as within the search area.

h) Hazardous Material Spill Report.

John Deer Tractor Company

The database indicates a spill between John Deer Tractor and the Ga. Power Substation on Industrial Way. The spill material appeared to be oil causing a sheen on a nearby pond.

i) SARA Title III Toxic Release Inventory.

City of Swainsboro

Industrial Way

The database indicated that 900 pounds of chlorine were released to water.

Roper

Electric Road

The database indicated releases of n-butyl alcohol and xylenes to the air and nickel to the local POTW and soils.

American Yard Products

Electric Road

The database indicated releases of n-butyl alcohol, isopropyl alcohol, 1,2,4-trimethylbenzene, toluene, and xylenes to the air; nickel and chromium to soils; and sodium hydroxide and sulfuric acid to the local POTW.

Swainsboro Electroplating

The database indicated releases of hydrochloric acid, sulfuric acid, nitric acid, nickel compounds, cyanide compounds, and sodium hydroxide to the air.

### 5.1.2 Regulatory Database Site Conclusions

Based on surface topography, none of the facilities listed above are in the same drainage basin or potentially upgradient of the site.

## 5.2 Local Governmental Agencies

### 5.2.1 Local Physical & Environmental Health Department

According to Mr. DeWayne Tanner of the Emanuel County Health Department, no incidents have occurred at the site involving his department.

### **5.2.2 Fire Marshal Records**

According to Sergeant Mike Strobridge of the Swainsboro Fire Department, no incidents have occurred at the site involving his department.

## **LIMITATIONS**

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The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

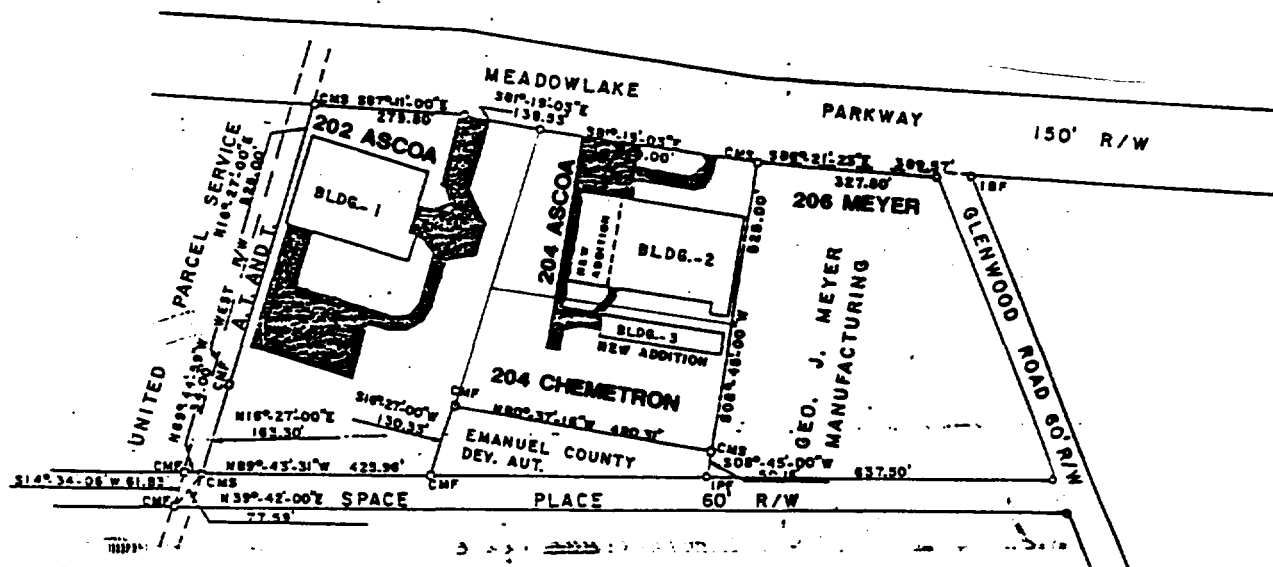
Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

The purpose of an environmental assessment is to reasonably evaluate the potential for or actual impact of past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

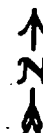
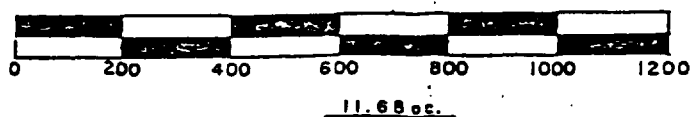
No investigation is thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not therefore be construed as a guarantee of the absence of such materials on the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

Environmental conditions may exist at the site that cannot be identified by visual observation. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

Except where there is express concern of our client, or where specific environmental contaminants have been previously reported by others, naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.



PROPERTY OF FIGGIE PROPERTIES, INC.  
 LOCATED IN THE CITY OF SWAINSBORO, 53rd G.M.D. IN EMANUEL  
 COUNTY, GEORGIA.



Taken from plat prepared by Walter K. Maupin dated July 17, 1989.

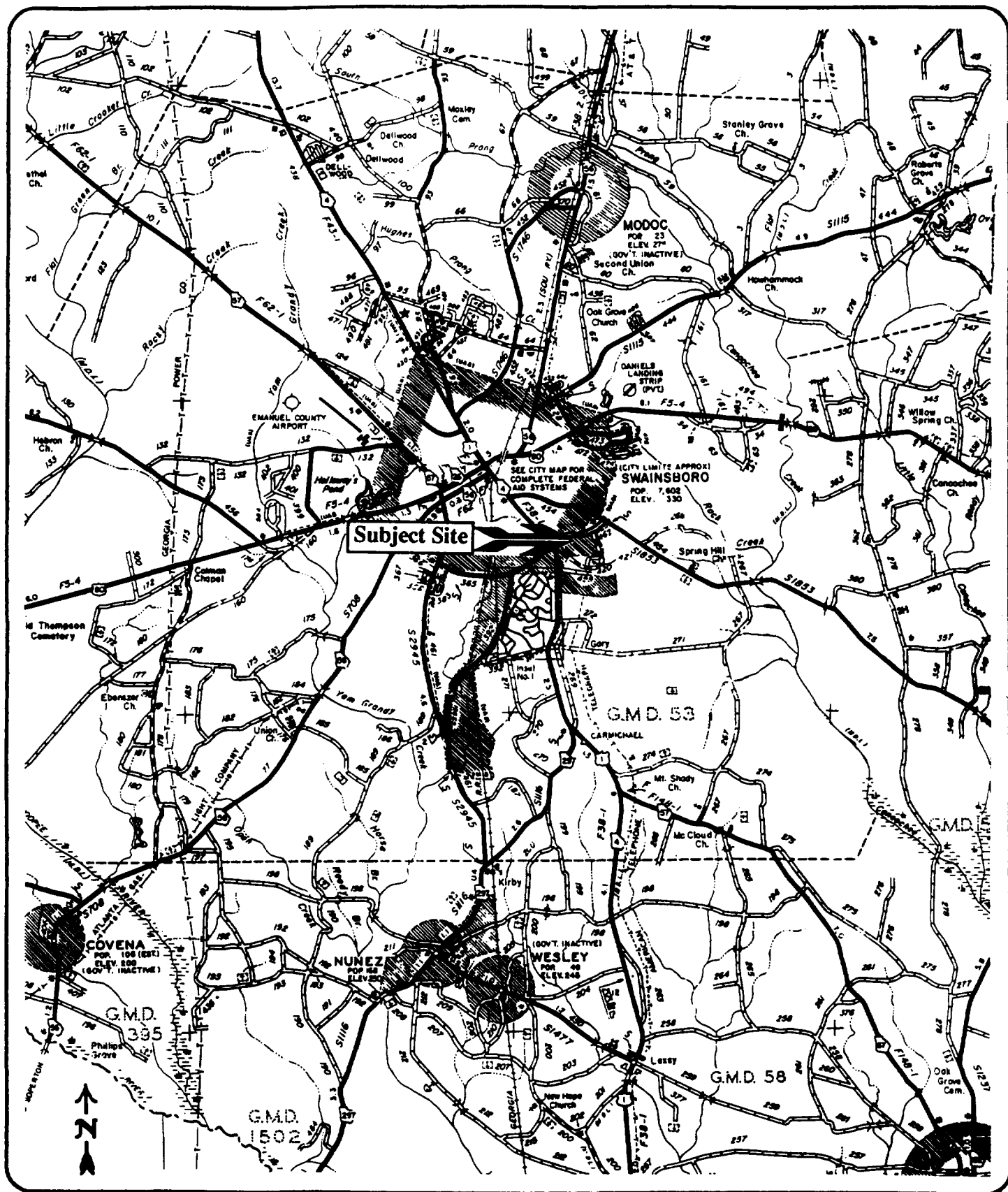


**EMCON**  
 SOUTHEAST

Figgie Properties  
 Phase I ESA  
 202,204,206 E. Meadowlake Parkway

Parcel Map

Figure  
 2



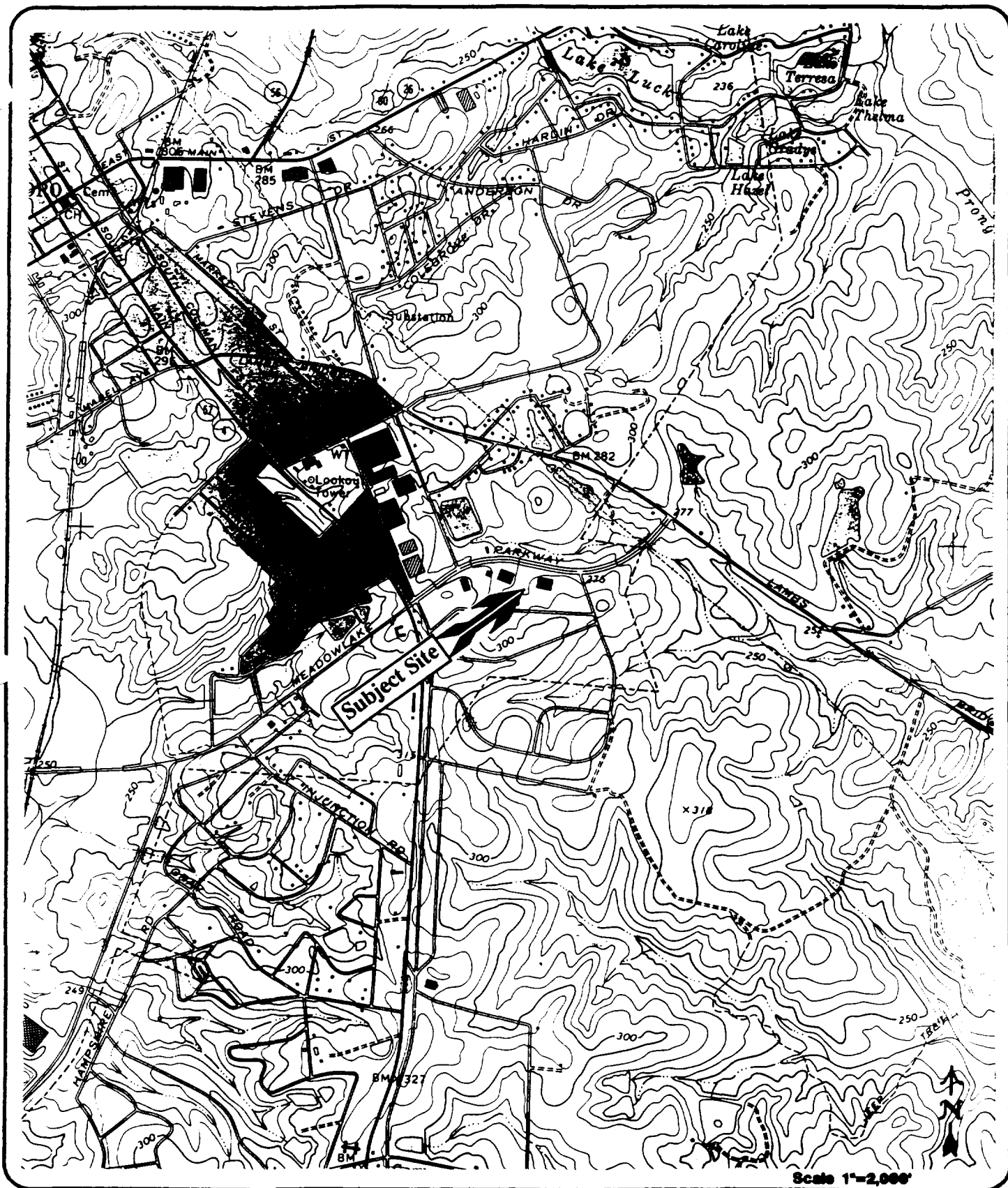
**EMCON**  
SOUTHEAST

Figgie Properties  
Phase I ESA  
202,204,206 E. Meadowlake Parkway

Location Map

Figure  
3





**EMCON**  
SOUTHEAST

Figgie Properties  
Phase I ESA  
202,204,206 E. Meadowlake Parkway

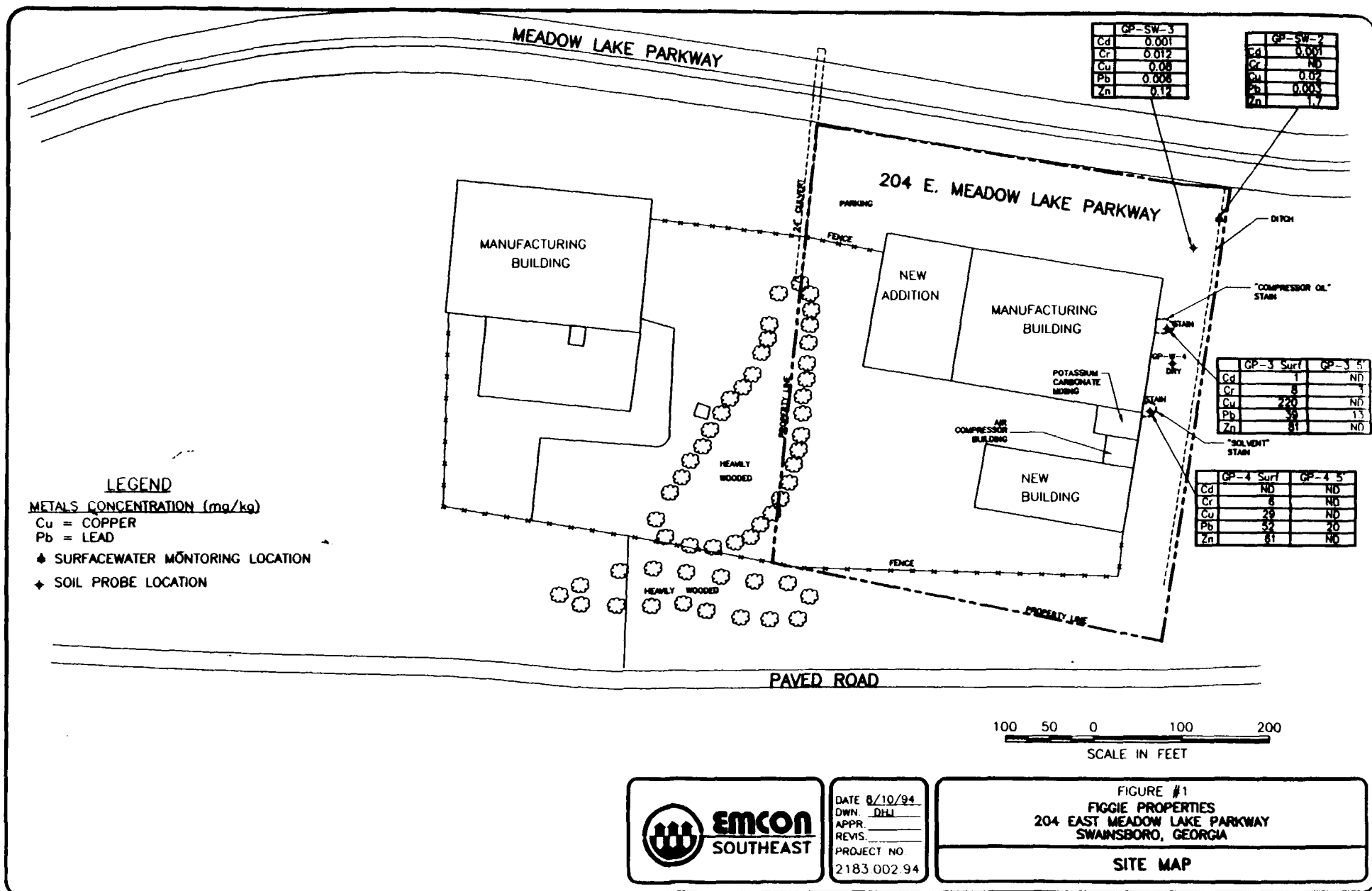
Topographic Map

Figure  
4



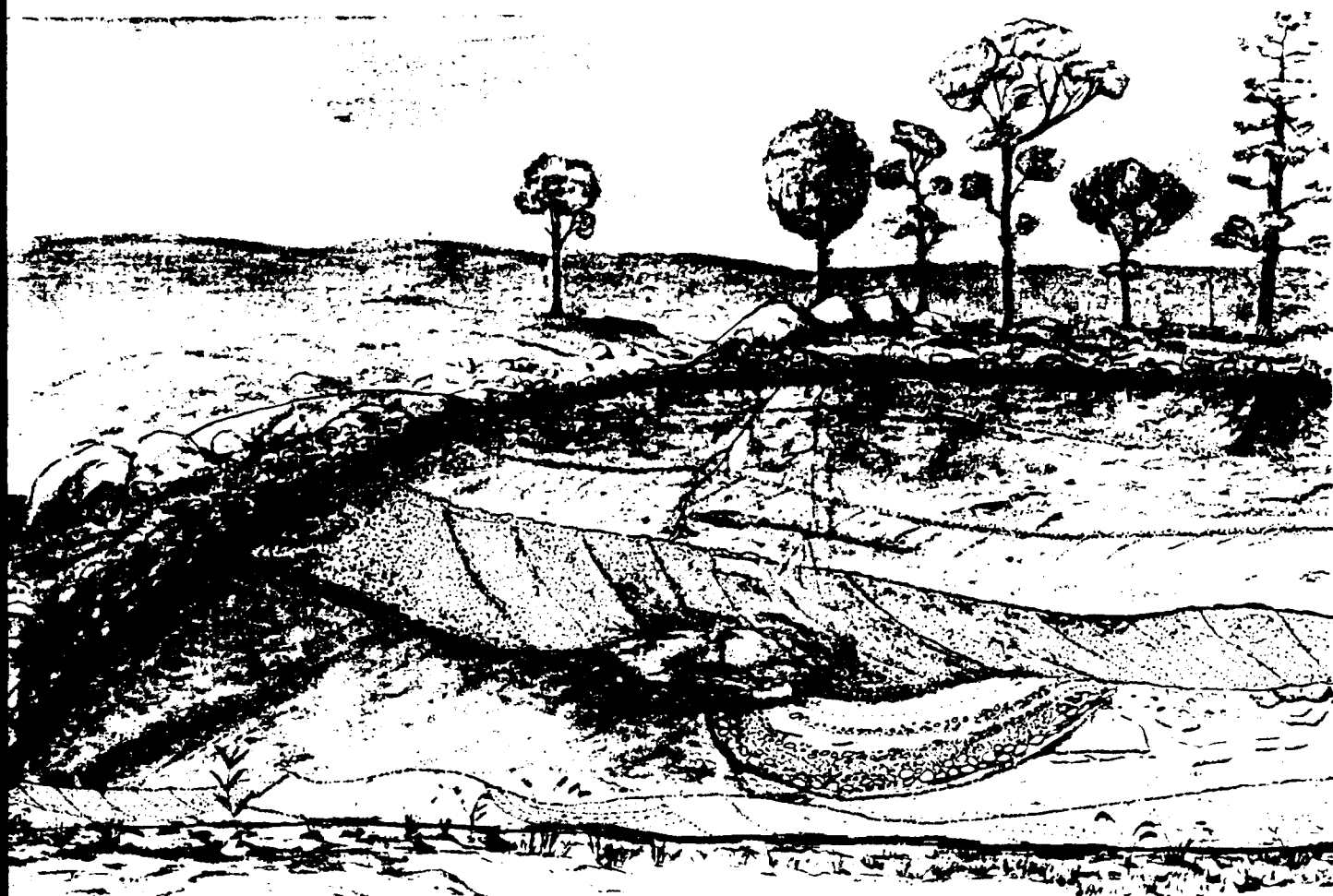
**EMCON SAMPLING AND ANALYSES**

**AUGUST, 1994**



# **HYDROGEOLOGY OF THE GORDON AQUIFER SYSTEM OF EAST-CENTRAL GEORGIA**

**Rebekah Brooks, John S. Clarke, and Robert E. Faye**



Prepared as part of the  
**ACCELERATED GROUND-WATER PROGRAM**  
in cooperation with the  
**DEPARTMENT OF THE INTERIOR**  
**U.S. GEOLOGICAL SURVEY**

**DEPARTMENT OF NATURAL RESOURCES**  
**ENVIRONMENTAL PROTECTION DIVISION**  
**GEORGIA GEOLOGIC SURVEY**

# HYDROGEOLOGY OF THE GORDON AQUIFER SYSTEM OF EAST-CENTRAL GEORGIA

By

Rebekah Brooks, John S. Clarke, and Robert E. Faye

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Department of Natural Resources  
J. Leonard Ledbetter, Commissioner

Environmental Protection Division  
Harold F. Reheis, Assistant Director

Georgia Geologic Survey  
William H. McLemore, State Geologist

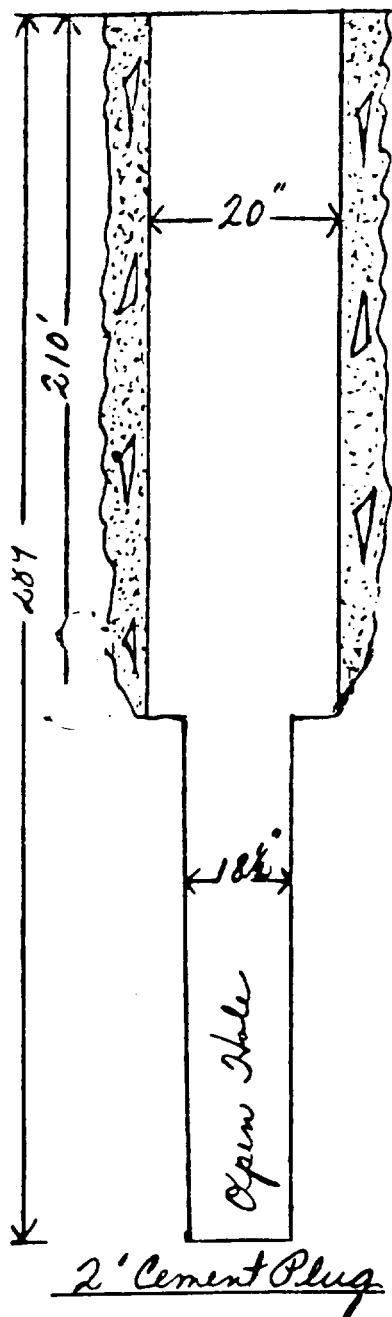
Atlanta, Georgia

1985

INFORMATION CIRCULAR 75

MEASUREMENTS TAKEN FROM (GROUND) (TOP OF FOUNDATION) (TOP OF CASING) (TOP BASE PLATE)

## BEARING OF THE WELL



## WELL DATA

STARTED WELL 7/24/ 1968 AND COMPLETED 8/23 1968  
 TOTAL DEPTH 289' ELEVATION \_\_\_\_\_ STATIC WATER LEVEL 36'6"  
 LENGTH SURFACE CASING \_\_\_\_\_ SIZE \_\_\_\_\_ THICKNESS \_\_\_\_\_  
 CEMENTED WITH \_\_\_\_\_ BAGS CEMENT TYPE PACKER \_\_\_\_\_  
 LENGTH WELL CASING 210' SIZE 20" WEIGHT 4" wall  
 CEMENTED WITH \_\_\_\_\_ BAGS CEMENT TYPE PACKER \_\_\_\_\_  
 INNER CASING LENGTH \_\_\_\_\_ SIZE \_\_\_\_\_ WEIGHT \_\_\_\_\_  
 WITH \_\_\_\_\_ X \_\_\_\_\_ GUIDES LOCATED \_\_\_\_\_ TYPE BACKOFF \_\_\_\_\_  
 LEAD SEAL \_\_\_\_\_ BACKPRESSURE VALVE \_\_\_\_\_ GUIDE \_\_\_\_\_  
 WELL STRAINER MAKE \_\_\_\_\_ SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ OPENING \_\_\_\_\_  
 TYPE MATERIAL \_\_\_\_\_ WITH \_\_\_\_\_ CONNECTIONS \_\_\_\_\_  
 SIZE HOLE DRILLED FOR SURFACE CASING \_\_\_\_\_ WITH \_\_\_\_\_  
 SIZE HOLE DRILLED FOR WELL CASING \_\_\_\_\_ WITH \_\_\_\_\_  
 SIZE HOLE DRILLED FOR STRAINER \_\_\_\_\_ WITH \_\_\_\_\_  
 YARDS OF GRAVEL USED \_\_\_\_\_ HOW PLACED \_\_\_\_\_  
 HOW WAS WELL DEVELOPED \_\_\_\_\_  
 NOTES: 79' - 18 1/2" open hole - 2' cement plug

RIG USED HD #8 DRILLER Carlos Holton

## PUMP RECORD

SERIAL NUMBER 60276 MAKE Layne FOUNDATION Concrete  
 LENGTH COLUMN 100' SIZE 8 x 1 3/16 TYPE WL 10 LENGTHS 20  
 BOWL SIZE 10" TYPE TLC STAGES 7 MATERIAL IMPELLER Bronze  
 MATERIAL BOWL C.I. WITH \_\_\_\_\_ PORTS AND \_\_\_\_\_ SHAFT  
 SUCTION SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ SUCTION STRAINER Yes  
 IS PUMP SEALED HOW No WHERE \_\_\_\_\_ WITH WHAT \_\_\_\_\_  
 LUBRICATOR TYPE \_\_\_\_\_ SIZE \_\_\_\_\_ VOLTAGE \_\_\_\_\_  
 LENGTH OF AIRLINE 100' SIZE 1/2" TYPE MATERIAL Plastic Tubing  
 AIR RELEASE VALVE TYPE \_\_\_\_\_ SIZE \_\_\_\_\_  
 SIZE SURFACE DISCHARGE \_\_\_\_\_ TYPE \_\_\_\_\_ DAYTON COUPLING \_\_\_\_\_  
 PRESSURE GAUGE \_\_\_\_\_ SPEED \_\_\_\_\_  
 NOTES 136'2" total setting 39' Static level,

RIG USED TO SET PUMP \_\_\_\_\_ INSTALLER Dewey Sims  
 DATE PUMP INSTALLED 10/11 1968 DATE IN OPERATION \_\_\_\_\_ 10

## MOTOR

MAKE U.S. HP 60 FRAME A404UP PHASE 3 CYCLE 60 VOLT. 440  
 SPEED 1750 MODEL Hollowshaft SERIAL NUMBER P4175930  
 TOP BEARING \_\_\_\_\_ BOTTOM BEARING \_\_\_\_\_ RATCHET \_\_\_\_\_  
 STARTER \_\_\_\_\_ PRESSURE SWITCH \_\_\_\_\_ FLOAT \_\_\_\_\_

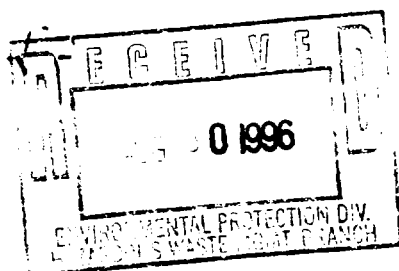
## GEAR

MAKE Johnson MODEL H090 SIZE \_\_\_\_\_ RATIO 1 to 1 NO. 43064  
 SIZE PULLEY \_\_\_\_\_ TYPE MOTOR FRAME BHP 90AT1760

## ENGINE

MAKE \_\_\_\_\_ MODEL \_\_\_\_\_ HP \_\_\_\_\_ SERIAL NUMBER \_\_\_\_\_  
 SPEED \_\_\_\_\_ SIZE PULLEY \_\_\_\_\_ FOUNDATION \_\_\_\_\_  
 TYPE FUEL TANK \_\_\_\_\_ MAKE MAG. \_\_\_\_\_ NO. \_\_\_\_\_  
 MAKE STARTER \_\_\_\_\_ NO. \_\_\_\_\_ TYPE FUEL \_\_\_\_\_  
 MAKE FLEXIBLE SHAFT \_\_\_\_\_ SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ BELT LENGTH \_\_\_\_\_

PURPOSE FOR WHICH THIS WATER IS USED \_\_\_\_\_  
 \_\_\_\_\_ CAPACITY \_\_\_\_\_



### FORMATION LOG OF THE WELL OR TEST HOLE

STARTED TEST HOLE 7/24 IS 68 FINISHED        IS        TEST HOLE NUMBER 1  
LOCATION Franklin County SEC        T        RANGE        ELEVATION       

TOTAL DEPTH	THICKNESS EACH STRATUM	FORMATION	TOTAL DEPTH	THICKNESS EACH STRATUM	FORMATION
0- 15		Red Clay	865-886		Med coarse pepper sand w/strks
15-40		White sandy clay			white clay
40- 85		Blue sandy clay	886-907		Coarse blue sand & wood
85-138		Blue clay & med coarse sand	907-928		Coarse white sand, little gravel
138-145		Limestone, shell, clay & sand			strks blue clay & wood
145-151		Blue clay	928-949		Coarse sand fine gravel w/strks
151-170		Sand, shell, clay & limestone			of blue clay
170-193		Blue clay	949-970		" " " " "
193-203		Black rock & mixed clay			
203-211		Limestone, shell, sand, & black rock			
211-253		Brown limestone & shell			
253-274		Brown limestone w/little blue clay			
274-295		Brown limestone w/little sand			
295-359		Fine sand, limestone & clay			
359-380		Sand, blue clay & little limestone			
380-401		Blue clay, limestone, little sand			
401-443		Blue clay, shell & limestone			
443-464		" " " " "			
464-548		Shell, blue clay & limestone			
548-591		Hard blue clay, shell, little limestone & sand			
591-609		mixed clay, pepper sand & limestone			
609-633		Med coarse sand, clay, limestone			
633-654		Coarse sand, shell streaks of clay			

MUD PIT SIZE \_\_\_\_\_ FT. X \_\_\_\_\_ FT. X \_\_\_\_\_ FT. DEEP

TYPE BIT USED TO CUT SAND \_\_\_\_\_

SIZE OF TEST HOLE THROUGH SAND \_\_\_\_\_

TYPE OF BIT USED TO CUT UPPER FORMATIONS \_\_\_\_\_

\_\_\_\_\_ SIZE \_\_\_\_\_

TYPE MUD PUMP USED \_\_\_\_\_

DRILLING PRESSURE IN SAND \_\_\_\_\_

TYPE OF MUD USED \_\_\_\_\_

NOTES: \_\_\_\_\_

**TEST DATA**

PRELIMINARY TEST		FINAL TEST
STATIC WATER LEVEL	36'6"	
PUMPEO G. P. M.	1094	
PRESSURE POUNDS		
DRAWDOWN	39'3"	
G. P. P. D.		
GUARANTEED G. P. M.	750	

### FORMATION LOG OF THE WELL OR TEST HOLE

STARTED TEST HOLE 7/24 IS 68 FEET DEEP IS          TEST HOLE NUMBER 1  
LOCATION Franklin County IS          FEET DEEP IS          RANGE          ELEVATION         

TOTAL DEPTH	THICKNESS EACH STRATUM	FORMATION	TOTAL DEPTH	THICKNESS EACH STRATUM	FORMATION
0- 15		Red Clay	865-886		Med coarse pepper sand w/strks
15-40		White sandy clay			white clay
40- 85		Blue sandy clay	886-907		Coarse blue sand & wood
85-138		Blue clay & med coarse sand	907-928		Coarse white sand, little gravel
138-145		Limestone, shell, clay & sand			strks blue clay & wood
145-151		Blue clay	928-949		Coarse sand fine gravel w/strks
151-170		Sand, shell, clay & limestone			of blue clay
170-193		Blue clay	949-970		" " " " "
193-203		Black rock & mixed clay			
203-211		Limestone, shell, sand, & black rock			
211-253		Brown limestone & shell			
253-274		Brown limestone w/little blue clay			
274-295		Brown limestone w/little sand			
295-359		Fine sand, limestone & clay			
359-380		Sand, blue clay & little limestone			
380-401		Blue clay, limestone, little sand			
401-443		Blue clay, shell & limestone			
443-464		" " " " "			
464-548		Shell, blue clay & limestone			
548-591		Hard blue clay, shell, little limestone & sand			
591-609		mixed clay, pepper sand & limestone			
609-633		Med coarse sand, clay, limestone			
633-654		Coarse sand, shell Streaks of clay			

MUD PIT SIZE \_\_\_\_\_ FT. X \_\_\_\_\_ FT. X \_\_\_\_\_ FT. DEEP

TYPE BIT USED TO CUT SAND \_\_\_\_\_

SIZE OF TEST HOLE THROUGH SAND \_\_\_\_\_

TYPE OF BIT USED TO CUT UPPER FORMATIONS \_\_\_\_\_

\_\_\_\_\_ SIZE \_\_\_\_\_

TYPE MUD PUMP USED \_\_\_\_\_

DRILLING PRESSURE IN SAND \_\_\_\_\_

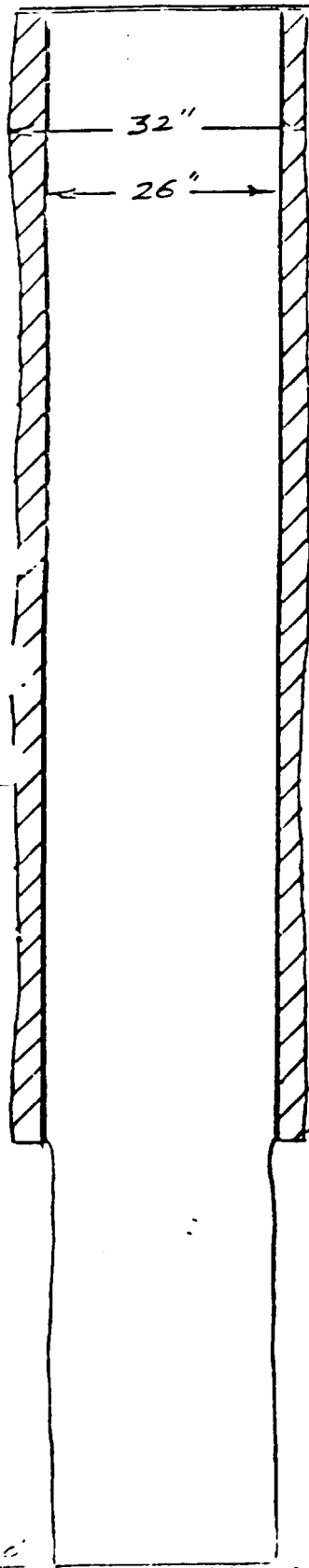
TYPE OF MUD USED \_\_\_\_\_

NOTES: \_\_\_\_\_

TEST DATA	
PRELIMINARY TEST	FINAL TEST
STATIC WATER LEVEL 36'6"	
PUMPED G. P. M. 1094	
PRESSURE POUNDS	
DRAWDOWN 39'3"	
G. P. P. D.	
GUARANTEED G. P. M. 750	



## DRAWING OF THE WELL



WELL DATA

STARTED WELL 7-11-72 IN 7ND CO DEPT. 10  
 TOTAL DEPTH 200' ELEVATION 57 STATIC WATER LEVEL 57  
 LENGTH SURFACE CASING 25' SIZE 4" THICKNESS .215  
 CEMENTED WITH 321 SACKS CEMENT TYPE PACKER \_\_\_\_\_  
 LENGTH WELL CASING \_\_\_\_\_ SIZE \_\_\_\_\_ WEIGHT \_\_\_\_\_  
 CEMENTED WITH \_\_\_\_\_ SACKS CEMENT TYPE PACKER \_\_\_\_\_  
 INNER CASING LENGTH \_\_\_\_\_ SIZE \_\_\_\_\_ WEIGHT \_\_\_\_\_  
 WITH \_\_\_\_\_ X \_\_\_\_\_ GUIDES LOCATED \_\_\_\_\_ TYPE BACKOFF \_\_\_\_\_  
 LEAD SEAL \_\_\_\_\_ BACKPRESSURE VALVE \_\_\_\_\_ GUIDE \_\_\_\_\_  
 WELL STRAINER MAKE none SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ OPENING \_\_\_\_\_  
 TYPE MATERIAL \_\_\_\_\_ WITH \_\_\_\_\_ CONNECTIONS \_\_\_\_\_  
 SIZE HOLE DRILLED FOR SURFACE CASING 32 WITH Tricone  
 SIZE HOLE DRILLED FOR WELL CASING 32 WITH \_\_\_\_\_  
 SIZE HOLE DRILLED FOR STRAINER None WITH \_\_\_\_\_  
 YARDS OF GRAVEL USED \_\_\_\_\_ HOW PLACED \_\_\_\_\_  
 HOW WAS WELL DEVELOPED \_\_\_\_\_  
 NOTES: Surging with test pump.  
Plugged bottom with 15 bags cement. Test hole 1014'  
 RIG USED Layne Ark DRILLER Orion Peoples

PUMP RECORD

SERIAL NUMBER 71103 MAKE LAYNE FOUNDATION CONCRETE  
 LENGTH COLUMN 130 SIZE 8 K 1 1/2 TYPE WATER <sup>10</sup>/<sub>20</sub> LENGTHS  
 BOWL SIZE 12 TYPE KEH STAGES 4 MATERIAL IMPELLER BRONZE  
 MATERIAL BOWL BRONZE WITH CLOSED PORTS AND S.S. SHAFT  
 SUCTION SIZE 8 LENGTH 10' SUCTION STRAINER 8" BRASS  
 IS PUMP SEALED HOW \_\_\_\_\_ WHERE \_\_\_\_\_ WITH WHAT \_\_\_\_\_  
 LUBRICATOR TYPE WATER SIZE \_\_\_\_\_ VOLTAGE \_\_\_\_\_  
 LENGTH OF AIRLINE 130 SIZE 1/4 TYPE MATERIAL GLV  
 AIR RELEASE VALVE TYPE CRISPEN SIZE 4"  
 SIZE SURFACE DISCHARGE 8 TYPE \_\_\_\_\_ DAYTON COUPLING 8"  
 PRESSURE GAUGE \_\_\_\_\_ SPEED \_\_\_\_\_  
 NOTES LINE SHAFT 416 S.S.

RIG USED TO SET PUMP GMC INSTALLER R. CASTLEBERRY  
 DATE PUMP INSTALLED 4-10 1972 DATE IN OPERATION \_\_\_\_\_ 19\_\_

MOTOR

MAKE LLS HP 100 FRAME 404 TP PHASE 3 CYCLE 60 VOLT. <sup>209/</sup>440 <sub>76</sub>  
 SPEED 1800 MODEL RL SERIAL NUMBER \_\_\_\_\_  
 TOP BEARING 7222 BOTTOM BEARING 6212 RATCHET NRR  
 STARTER A-B PRESSURE SWITCH \_\_\_\_\_ FLOAT \_\_\_\_\_

GEAR

MAKE JOHNSON MODEL COMB. SIZE HE 150 RATIO 1:1 NO. 1  
 SIZE PULLEY \_\_\_\_\_ TYPE MOTOR FRAME VHS  
5/N 46277

ENGINE

MAKE WAUKESHAU MODEL F554GU HP 141 SERIAL NUMBER \_\_\_\_\_  
 SPEED 1800 SIZE PULLEY \_\_\_\_\_ FOUNDATION CONCRETE  
 TYPE FUEL TANK 200 GAL. MAKE MAG. \_\_\_\_\_ NO. \_\_\_\_\_  
 MAKE STARTER \_\_\_\_\_ NO. \_\_\_\_\_ TYPE FUEL GASOLINE  
 MAKE FLEXIBLE SHAFT W/S SIZE 48 LENGTH 9" BELT LENGTH 12 VOLT BATTERY

WATER

PURPOSE FOR WHICH THIS WATER IS USED MUNICIPAL  
 TEMPERATURE \_\_\_\_\_ IS WATER CLEAR \_\_\_\_\_ CAPACITY \_\_\_\_\_  
 SAND \_\_\_\_\_ HARDNESS 115 PH 7.6 IRON 0.16 PPM  
 TREATMENT USED CL

City of Swainsboro  
Fortune Loop Water Plant  
HWD Project No. WS-1A-103

FORMATION LOG OF THE WELL OR TEST HOLE

STARTED TEST HOLE Nov. 22 19 71 FINISHED Dec. 1 19 71 TEST HOLE NUMBER 1  
LOCATION Fortune Loop Water Plant SEC TS RANGE ELEVATION  
Swainsboro, Georgia

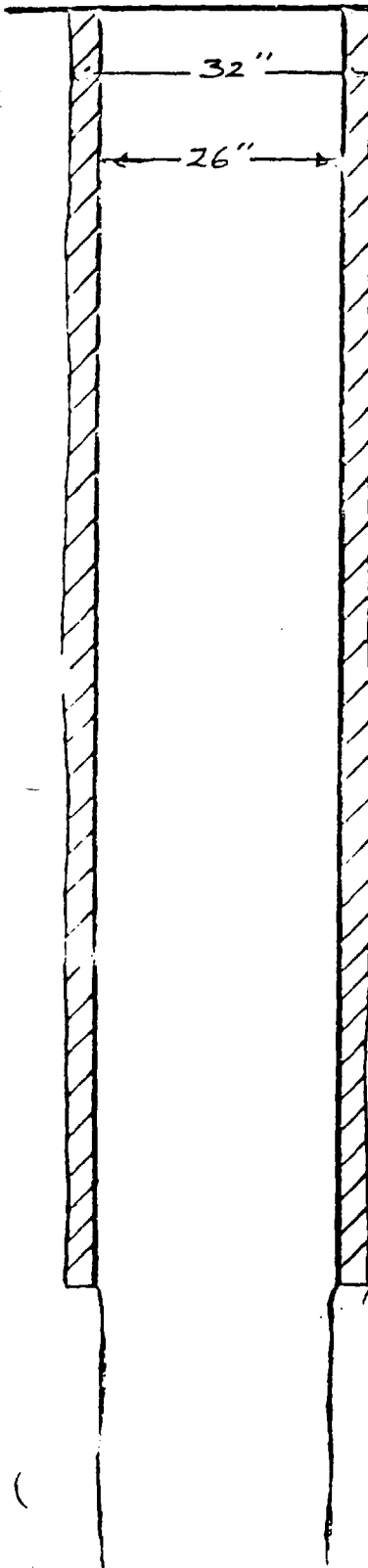
TOTAL DEPTH	THICKNESS EACH STRATUM	FORMATION	TOTAL DEPTH	THICKNESS EACH STRATUM	FORMATION
4	4	Fill Dirt	831	16	Sand, Shell & Blue Clay
7	3	Sand	846	15	Sandy Clay-Slow
39	32	White Clay	882	26	Coarse Sandy Clay
54	15	Blue Clay	900	18	Coarse Sand/Lots of Clay-Slow
78	24	Blue Clay W/Sand	924	24	Sandy Blue Clay-Slow
104	26	Blue Clay	1000	76	Sand & Blue Clay
140	36	Sandy Clay & Rock	1014	14	Blue Clay & Yellow Sand
170	30	Sand Stone & Clay - V-Slow			
185	15	Blue Sandy Clay			
200	15	Limestone & Clay-Very Slow			
215	15	Limestone & Clay			
230	15	Limestone-Soft			
260	30	Limestone Hard & Soft Stks.			
275	15	Limestone W/Stks. of Sand			
291	16	Sand & Limestone			
307	14	Sand, Shell W/Clay			
323	16	Sand & Shell			
400	77	Sand, Clay & Shell			
415	15	Blue Clay & Shell			
461	46	Blue Clay & Limestone			
476	15	Shell & Sand			
491	15	Shell, Limestone & Sand			
506	15	Limestone & Clay			
537	31	Limestone W/Stks. Sand & Clay			
568	31	Sand & Shell w/little Clay			
584	16	Sandy Clay & Shell			
600	16	Sandy Clay & Limestone			
630	30	Limestone, Shell, Little Clay			
645	15	Limestone & Shell			
660	15	Limestone & Shell			

TEST DATA

PRELIMINARY TEST	FINAL TEST
STATIC WATER LEVEL 57	
PUMPED G. P. M. 1212	
PRESSURE, POUNDS	
DRAWDOWN 43	
G. P. F. D. 28.3	
GUARANTEED G. P. M. 1000	
GUARANTEED PRESSURE 12-16-7	
DATE OF TEST	

REMARKS

## DRAWING OF THE WELL



## WELL DATA

STARTED WELL Oct. 4 1971 AND COMPLETED Nov. 11 1971  
 TOTAL DEPTH 256 ELEVATION            STATIC WATER LEVEL 180'  
 LENGTH SURFACE CASING 273 SIZE 26" THICKNESS 0.375  
 CEMENTED WITH 500 SACKS CEMENT TYPE PACKER             
 LENGTH WELL CASING            SIZE            WEIGHT             
 CEMENTED WITH            SACKS CEMENT TYPE PACKER             
 INNER CASING LENGTH            SIZE            WEIGHT             
 WITH X GUIDES LOCATED            TYPE BACKOFF             
 LEAD SEAL            BACKPRESSURE VALVE            GUIDE             
 WELL STRAINER MAKE            SIZE            LENGTH            OPENING             
 TYPE MATERIAL            WITH            CONNECTIONS             
 SIZE HOLE DRILLED FOR SURFACE CASING 32 WITH Hughes  
 SIZE HOLE DRILLED FOR WELL CASING 25 WITH "  
 SIZE HOLE DRILLED FOR STRAINER            WITH             
 YARDS OF GRAVEL USED            HOW PLACED             
 HOW WAS WELL DEVELOPED Surging with test pump.  
 NOTES Run test hole 1011 feet.  
 RIG USED Layne Ark R-27 DRILLER Orion Peeples

## PUMP RECORD

SERIAL NUMBER 48128 MAKE LAYNE FOUNDATION CONCRETE  
 LENGTH COLUMN 240' SIZE B X 1 1/2 X 2 1/2 TYPE OIL # 10 LENGTHS 25  
 BOWL SIZE 10 TYPE THC STAGES 10 MATERIAL IMPELLER BRONZE  
 MATERIAL BOWL C.I. WITH OPEN PORTS AND S.S. SHAFT  
 SUCTION SIZE 8 LENGTH 10' SUCTION STRAINER 8" LONG  
 IS PUMP SEALED HOW            WHERE            WITH WHAT             
 LUBRICATOR TYPE OIL SIZE 1 QT VOLTAGE 440  
 LENGTH OF AIRLINE 240 SIZE 1/4" TYPE MATERIAL GALV  
 AIR RELEASE VALVE TYPE CRIPEN SIZE 4"  
 SIZE SURFACE DISCHARGE 8 TYPE            DAYTON COUPLING 8"  
 PRESSURE GAUGE            SPEED             
 NOTES REMOVED FROM EXISTING WELL - REVISED TO  
10 STAGE BOWL PRODUCING APPROX. 1100 GPM @ 172' PL  
 RIG USED TO SET PUMP GMC INSTALLER R. CASTLEBERRY  
 DATE PUMP INSTALLED 12-5-1971 DATE IN OPERATION 12-5-1971

## MOTOR

MAKE U.S. HP 125 FRAME 445UP PHASE 3 CYCLE 60 VOLT 220/440  
 SPEED 1760 MODEL B HH SERIAL NUMBER             
 TOP BEARING            BOTTOM BEARING            RATCHET             
 STARTER EXISTING A-B PRESSURE SWITCH            FLOAT             
TRANSFERRED TO NEW WELL

## GEAR

MAKE            MODEL            SIZE            RATIO            NO             
 SIZE PULLEY            TYPE MOTOR FRAME           

## ENGINE

MAKE            MODEL            HP            SERIAL NUMBER             
 SPEED            SIZE PULLEY            FOUNDATION             
 TYPE FUEL TANK            MAKE MAG             
 MAKE STARTER            NO            TYPE FUEL             
 MAKE FLEXIBLE SHAFT            SIZE            I.E. 1 BELT LENGTH           

PURPOSE FOR WHICH THIS WATER IS USED MUNICIPAL  
 TREATED WATER            IS WATER CLEAR YES  
 G.P.D. 1250 G.P.D. 1250 G.P.D. 1250

WELL DATA SHEET FOR PUBLIC WATER SYSTEM  
 (TO BE COMPLETED BY WATER WELL CONTRACTOR)

NAME OF WATER SYSTEM: City of Swainsboro COUNTY: Emanuel  
 LOCATED AT: \_\_\_\_\_ TYPE WATER SYSTEM: COMMUNITY ☒ NON-COMMUNITY \_\_\_\_\_  
 OWNER: City of Swainsboro DRILLER: Virginia Supply & Well Co.  
 ADDRESS: Swainsboro, Georgia ADDRESS: P O Box 14145 - Atlanta, Ga. 30303  
 PHONE: \_\_\_\_\_ PHONE: 875-0441 LIC. NO.: 36

WELL DESCRIPTION

DATE DRILLED: 3/19  
 TOTAL DEPTH: 330 FT.  
 TYPE DRILLING (INDICATE):  
 ROTARY ☒ PERCUSSION \_\_\_\_\_ OTHER \_\_\_\_\_  
 HOLE DIAMETER  
 SIZE: 30 IN., FROM 0 FT. TO 230 FT.  
 SIZE: 24 IN., FROM 230 FT. TO 330 FT.  
 SIZE: \_\_\_\_\_ IN., FROM \_\_\_\_\_ FT. TO \_\_\_\_\_ FT.  
 (USE ADDITIONAL SHEETS IF NECESSARY)

casing RECORD

TYPE MATERIAL: Steel  
 WALL THICKNESS: .500  
 WEIGHT/FOOT: 125.49  
 SIZE: 24 IN., FROM 0 FT. TO 230 FT.  
 SIZE: \_\_\_\_\_ IN., FROM \_\_\_\_\_ FT. TO \_\_\_\_\_ FT.  
 SIZE: \_\_\_\_\_ IN., FROM \_\_\_\_\_ FT. TO \_\_\_\_\_ FT.  
 (USE ADDITIONAL SHEETS IF NECESSARY)

WELL SCREEN

TYPE MATERIAL: \_\_\_\_\_  
 SIZE: \_\_\_\_\_ IN., FROM \_\_\_\_\_ FT. TO \_\_\_\_\_ FT.  
 SIZE: \_\_\_\_\_ IN., FROM \_\_\_\_\_ FT. TO \_\_\_\_\_ FT.  
 SIZE: \_\_\_\_\_ IN., FROM \_\_\_\_\_ FT. TO \_\_\_\_\_ FT.  
 SIZE: \_\_\_\_\_ IN., FROM \_\_\_\_\_ FT. TO \_\_\_\_\_ FT.  
 WAS SLOT SIZE DETERMINED BY SIEVE ANALYSIS:  
 YES \_\_\_\_\_ NO \_\_\_\_\_

GROUTING

TYPE GROUT: Cement  
 APPLIED BY PRESSURE: YES ☒ NO \_\_\_\_\_  
 FROM 0 FT. TO 230 FT.

STATIC WATER LEVEL: 122 FT.  
 PUMPING WATER LEVEL: 219 FT. AT 1500 GPM

TEST PUMP DATA

DATE TESTED: 3/81  
 PUMPED ☒ BAILED \_\_\_\_\_ ESTIMATED \_\_\_\_\_  
 PUMP RATED: \_\_\_\_\_ GPM \_\_\_\_\_ HP  
 TOTAL CONTINUOUS HRS. TESTED: 26  
 DID WATER LEVEL STABILIZE: YES ☒ NO \_\_\_\_\_  
 HRS. RUN BEFORE STABILIZATION: \_\_\_\_\_  
 YIELD 1500 GPM AFTER 24 HRS. OF CONTINUOUS PUMPING  
 DISCHARGE PRESSURE: 0 PSI  
 WATER LEVEL BEFORE TEST: 122 FT.  
 TOTAL DRAWDOWN: 97 FT.  
 (ATTACH COPY OF DRAWDOWN MEASUREMENTS)  
 SPECIFIC CAPACITY: 15.4 GPM/FT.  
 NO. MINUTES FOR WELL TO RECOVER: 10 to 147'  
 WAS WELL DEVELOPED AND DISINFECTED: YES ☒ NO \_\_\_\_\_  
 WERE UNTREATED WATER SAMPLES COLLECTED

FOR BACTI: YES ☒ NO \_\_\_\_\_

FOR CHEMICAL: YES ☒ NO \_\_\_\_\_

PERMANENT PUMP DATA (BY CONTRACTOR OR OWNER) Line Shaft

PUMP TYPE: Turbine OUTLET SIZE 8 IN.  
 POWERED BY: 125 HP  
 RATE: 1,000 GPM  
 TOTAL DYNAMIC HEAD: 360 FT.  
 PUMP SET AT: 200 FT.  
 PUMP DISINFECTED: YES ☒ NO \_\_\_\_\_  
 DEEP WELL/LINE TYPE MATERIAL: Plastic  
 \_\_\_\_\_ FT.

24.  
April 15, 1969

City of Swainsboro  
Swainsboro, Georgia

Re: Project WS-3-11-0006  
Well, Pump, etc.

Gentlemen:

Another monthly inspection has been made on the equipment furnished under above contract. Results are as follows:

1. Static level: 85 feet.
2. Drawdown at pumping capacity: 25 feet.
3. Pump RPM: 1750
4. Pump shaft lubrication: okay at 10 drops per minute.
5. Motor, starter and electrical equipment: okay.
6. No maintenance required at this time on our behalf.

Yours truly,

Southern Drillers, Inc.

A. W. Floyd

ANF/so

✓cc: Thomas and Hutton Engineering Company  
20 Bay Street, East  
Savannah, Georgia 31402

2

4

THOMAS AND HUTTON ENGINEERING CO.

20 DAY STREET, EAST  
SAVANNAH, GEORGIA 31402

HUE THOMAS, JR.  
JOSEPH J. HUTTON

W. G. FOSTER  
F. V. GEORGE, JR.  
W. C. POWERS

November 3, 1967

City of Swainsboro  
City Hall  
Swainsboro, Georgia

Re: H.U.D. Project WS-3-11-0006  
Water Facilities

Gentlemen:

The electric resistivity and gamma radiation log of the test well drilled at the well site indicated a limestone aquifer at a depth of 223 to 294 ft. In order to determine the capacity of this aquifer the Contractor conducted test pumping under our supervision. These tests were made on October 19 and 20.

The well has been drilled 740' @ 10" dia., and 310' @ 20" dia. The outer casing is set at 227' and a concrete plug was placed at 310' to make the test. The test was started with the static water level at 84' after 8 hrs. pumping at approximately 1100 gpm the water level stabilized at 132'. The pumping rate was reduced to 900 gpm and the water level stayed at 122' for 20 hours of continuous pumping. When pumping was stopped the water level rose to 92' in 4 hrs. The pumping started again at a rate of 750 gpm and the water level remained unchanged at 115' for 1-1/2 hrs.

Two samples of the water taken after 30 hrs. of pumping were analyzed by Orlando Laboratories, Inc. (copies attached) which indicate a good quality water is available in this aquifer. The pumping test convinces us that the specified 750 gpm can be pumped from the aquifer without excessive drawdown.

The well specified required 100' of screened gravel to intercept the water bearing sands below the limestone. We believe the quality of the water from these sands is poorer than that from the limestone aquifer and recommend that the screens be eliminated and the limestone be the source.

We asked the Contractor for a credit if the screens are eliminated and his reply of October 30 states \$3,100. This is less than we hoped but since the material is on the site and must be restocked, we consider the credit of \$3,100 to be fair.

We therefore recommend that Change Order No. 1 be issued omitting the gravel wall features of the well, and that the contract price be reduced from \$73,200 to \$70,100. If this is satisfactory, please sign all copies of the enclosed Change Orders and return them to us for acceptance by the Contractor. We will then submit the necessary copies to H. U. D. and send a signed copy to you.

Very truly yours,

THOMAS & HUTTON ENGINEERING CO.



Joseph J. Hutton

JJH:fb  
Encl.

# WATER ANALYSIS REPORT

# ANALYTICAL LABORATORY DIVISION

Report to: *Southern Drillers*  
 Date: *October 24, 1967*  
 Sample Number: *1815*

Appearance: *clear*  
 Sampled by: *Client*  
 Identification: *City of Swainsboro, Ga.*

## METHODS

This water was analyzed using methods adapted from "Standard Methods for the Examination of Water and Wastewater," Twelfth Edition, 1965, APHA, AWWA and WPCF.

## RESULTS

Determination	ppm	Determination	ppm
Total Dissolved Solids, at 105 C	<i>170</i>	Sulfate, as $SO_4$	<i>10</i>
Total Hardness, as $CaCO_3$	<i>114</i>	Fluorides, as F	<i>0</i>
Calcium Hardness, as $CaCO_3$	<i>110</i>	Silica, as $SiO_2$	<i>18.5</i>
Magnesium Hardness, as $CaCO_3$	<i>4</i>	Copper, as Cu	<i>0</i>
Calcium, as Ca	<i>44</i>	Phosphate (Total), as $PO_4$	<i>2.2</i>
Magnesium, as Mg	<i>0.9</i>	Color, Standard Platinum-Cobalt Scale	<i>0</i>
Alkalinity (Phenolphthalein) as $CaCO_3$	<i>0</i>	Odor	<i>0</i>
Alkalinity (Total), as $CaCO_3$	<i>146</i>	pH (Laboratory)	<i>7.7</i>
Carbonate Alkalinity, as $CaCO_3$	<i>0</i>	pHs	<i>7.4</i>
Bicarbonate Alkalinity, as $CaCO_3$	<i>146</i>	Stability Index	<i>7.1</i>
Hydroxides, as OH	<i>0</i>	Saturation Index	<i>0.3</i>
Carbon Dioxide, as $CO_2$	<i>6</i>	Turbidity, Silica Scale	<i>0</i>
Carbonates, as $CO_3$	<i>0</i>		
Bicarbonates, as $HCO_3$	<i>89</i>		
Chlorides, as Cl	<i>1</i>		
Iron, as Fe	<i>0.1</i>		
Manganese, as Mn	<i>0</i>		

Signed

*J. Hobbs*  
 Chemist



# WATER ANALYSIS REPORT

# ANALYTICAL LABORATORY DIVISION

Report to: *Southern Drillers*  
 Date: *October 25, 1967*  
 Sample Number: *1819*

Apparatus: *Clear*  
 Sampled by: *Client*  
 Ident. location: *City of Gainesboro, Ga.  
 Sample # 2*

## METHODS

This water was analyzed using methods adapted from "Standard Methods for the Examination of Water and Wastewater," Eighth Edition, 1965, APHA, AWWA and WPCF.

## RESULTS

Determination	p.p.m.	Determination	p.p.m.
Total Dissolved Solids, @ 105 C	170	Sulfate, as SO <sub>4</sub>	10
Total Hardness, as CaCO <sub>3</sub>	122	Fluorides, as F	0
Calcium Hardness, as CaCO <sub>3</sub>	116	Silica, as SiO <sub>2</sub>	19
Magnesium Hardness, as CaCO <sub>3</sub>	6	Copper, as Cu	0
Calcium, as Ca	46	Phosphate (Total), as PO <sub>4</sub>	0.6
Magnesium, as Mg	1.5	Color, Standard Platinum-Cobalt Scale	0
Alkalinity (Phenolphthalein) as CaCO <sub>3</sub>	0	Odor	0
Alkalinity (Total), as CaCO <sub>3</sub>	142	pH (Laboratory)	7.5
Carbonate Alkalinity, as CaCO <sub>3</sub>	0	pH	7.4
Bicarbonate Alkalinity, as CaCO <sub>3</sub>	142	Stability Index	7.3
Hydroxides, as OH	0	Saturation Index	0.1
Carbon Dioxide, as CO <sub>2</sub>	9	Turbidity, Silica Scale	0
Carbonates, as CO <sub>3</sub>	0		
Bicarbonates, as HCO <sub>3</sub>	87		
Chlorides, as Cl	2		
Iron, as Fe	0.05		
Manganese, as Mn	0		

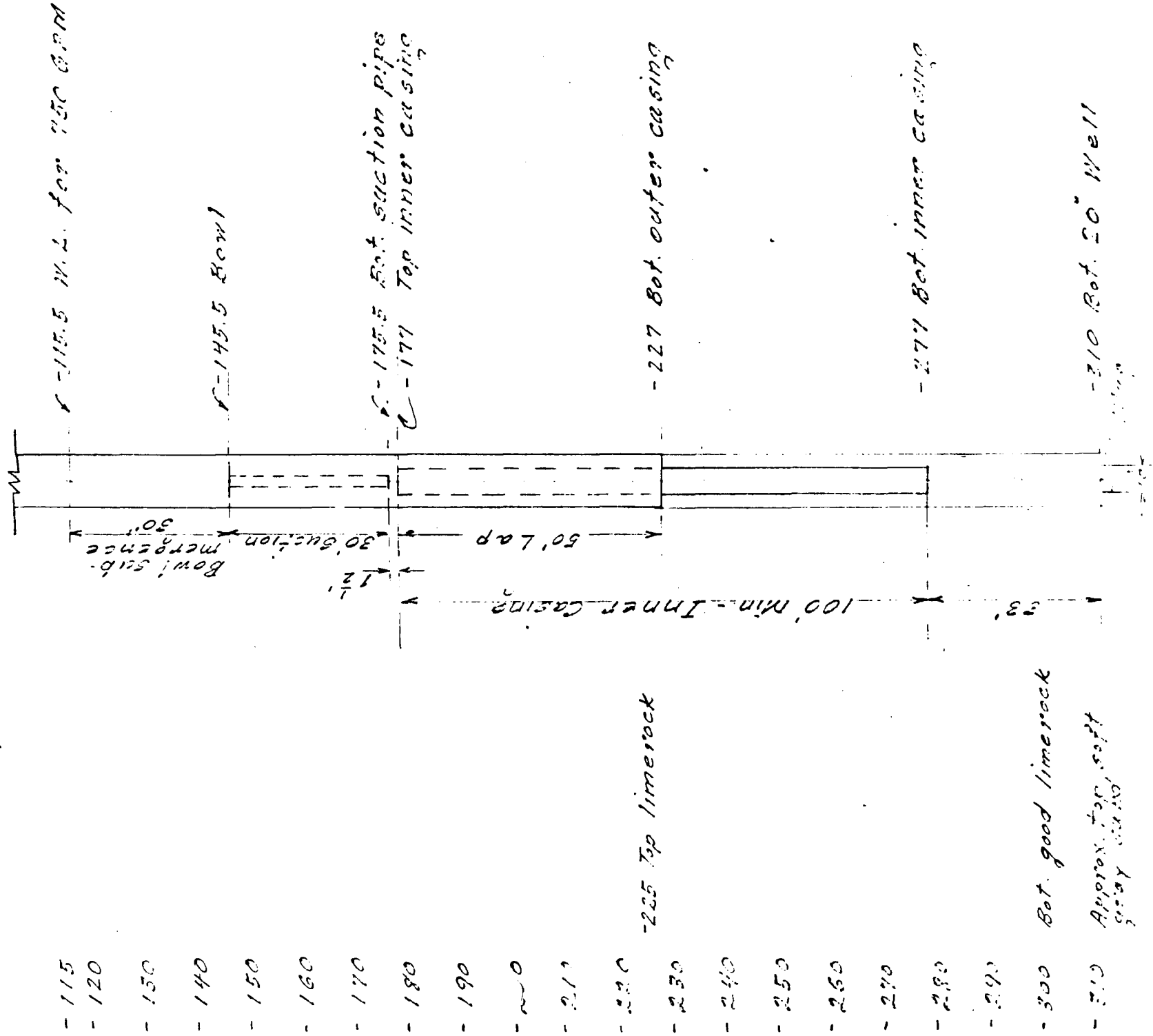
Signed

*J. Hobbs*  
 Chemist

904-310

Swainboro, Ga. - 1900's

Proposed installation of casing, pump bowl and suction pipe.



Estimates, Provision

Estimates

Casing at 12" casing

(1) 20' casing:	
73'300 x \$2,500 =	\$181,500.00
(2) 12" casing:	
300/400 x \$3,600 =	2,700.00
(3) 100' casing:	
100'900 x \$6,300 =	6,300.00
(4) 100' casing:	
390/400 x \$11,900 =	6,630.00
(5) Gravel space:	
100'900 x \$1,750 =	1,750.00
Total - - - -	\$18,255.00

NOTE: The above casing are based on straight line cost method receiving its estimation decrease in proportion. Many possible other things, the estimator will probably count that the indicated over-all cost should be reduced by (1) 9.1% for anticipation profit on the estimation received, (2) by the proportion of the cost of moving and setting up the equipment to erect the casing and (3) by some amount to adjust the difference in cost per line ft. between 12" casing for a 12" casing

Sheet 134

At the water City of Birmingham, Ala.  
 distance 10" Test at 11:15 Capacity 1-580  
 on pipes 6"

Date	Water Level	Brown	Inches	RPM	Remarks
8:00 A	84	Start pumping			
8:15	121	37'	52	1,000	Water clear
8:30	123	39'	52		"
8:31	Increased RPM				"
9:00	126	42'	52		"
9:05	131	47'	64½	1,103	"
9:30	131½	47½	64½		"
9:50	132	48	64½		"
10:01	Increased RPM				"
10:15	135½	51½	70	1,140	"
10:30	136	52	70		"
10:45	136	52	70		"
11:00	136	52	70		"
11:05	Start surging & backwashing				
11:30	Resumed pumping				Water clear
11:45	132	48	70	1,140	Water almost clear
11:50	132	48	70		Water clear
12:00 N	133	49	70		"
12:30 P	134	50	70		"
12:31	Increased RPM				
2:35	132	48	64½	1,103	"
1:15	132	48	64½		"

Feb 2 2004

Date and Time	Water Level	Speed Stations	h inches	Remarks
10/19/67 2:00P	132	48	64½	1.105
3:00P	132½	48½	64½	
4:00P	132½	49½	64½	
4:05P	Reduced RPM			
4:30P	124	40	41½	901
5:00P	123	39	41½	
6:00P	122½	38½	41½	
7:00P	122½	38½	41½	
8:00P	123	39	41½	
9:00	122½	38½	41½	
10:00	122½	38½	41½	
11:00P	122	38	41½	
10/20/67 12:01A	122	38	41½	
1:00A	122½	38½	41½	
2:00A	122	38	41½	
3:00A	122	38	41½	
4:00A	122½	38½	41½	
5:00A	122	38	41½	
6:00P	122½	38½	41½	
7:00P	122½	38½	41½	
8:00P	122½	38½	41½	
9:00P	122½	38½	41½	
10:00P	122½	38½	41½	

Sheet 3 of 4

<u>Date</u> <u>Time</u>	<u>Water Level</u>	<u>Draw</u>	<u>to</u> <u>Surface</u>	<u>SPM</u>	<u>Remarks</u>
10/20/67					
9:50 A	122.3	38.3	41 1/2	901	Water clean
10:30	122.5	38.5	41 1/2	901	"
11:15	122.5	38.5	41	896	"
12:00 P	122.5	38.5	41 1/2	901	"

### Test Pumps:

Fairbanks - Morse POMONA

12" Bowl; 8" collar; 6-stage; 8" Auction  
Bowl at - 195

Auction at - 215

### Well:

Depth: 10" - 740' (Plugged at 310').  
20" - 310'

Outer casing - 227'

### Recovery Test:

<u>Time</u>	<u>W.L.</u>	<u>Time</u>	<u>W.L.</u>
10/20/67		10/20/67	
12:15 P	-122'-6"	2:01 P	-115'-3"
12:16 P	- 96'-0"	2:03 P	- 94'-0"
12:17 P	- 94'-6"	2:04 P	- 93'-2"
12:18 P	- 94'-0"	2:05 P	- 92'-10"
12:19 P	- 93'-8"	2:06 P	- 92'-10"

Sheet 4 of 12

Draw down test at pumping

rate of 760 GPM. (h=29")

Static Water Level - 81' 0"

Water Level

Time

10/20/67

12:22 P

12:25 P

12:28 1/2 P

12:32 P

12:36 P

12:38 P

12:43 P

12:48 P

12:58 P

2:00 P

2:01 P

Static Pump

- 92' - 0"

- 113' - 0"

- 115' - 0"

- 115' - 0"

- 115' - 1"

- 115' - 2"

- 115' - 3"

- 115' - 3"

- 115' - 3 1/2"

- 115' - 3"

- 115' - 3"

- 115' - 3"

# WATER ANALYSIS REPORT

# ANALYTICAL LABORATORY DIVISION

Report to: Southern Drillers  
 Date: October 24, 1967  
 Sample Number: 1815

Appearance: Clear  
 Sampled by: Client  
 Identification: City of Swainsboro, Ga.  
Sample #1

## METHODS

This water was analyzed using methods adapted from "Standard Methods for the Examination of Water and Wastewater," Twelfth Edition, 1965, APHA, AWWA and WPCF.

## RESULTS

Determination	p.p.m.	Determination	p.p.m.
Total Dissolved Solids, @ 105°C	170	Sulfate, as SO <sub>4</sub>	10
Total Hardness, as CaCO <sub>3</sub>	114	Fluorides, as F	0
Calcium Hardness, as CaCO <sub>3</sub>	110	Silica, as SiO <sub>2</sub>	18.5
Magnesium Hardness, as CaCO <sub>3</sub>	4	Copper, as Cu	0
Calcium, as Ca	44	Phosphate (Total), as PO <sub>4</sub>	2.2
Magnesium, as Mg	0.9	Color, Standard Platinum Cobalt Scale	0
Alkalinity (Phenolphthalein), as CaCO <sub>3</sub>	0	Odor	0
Alkalinity (Total), as CaCO <sub>3</sub>	146	pH (Laboratory)	7.7
Carbonate Alkalinity, as CaCO <sub>3</sub>	0	pHs	7.4
Bicarbonate Alkalinity, as CaCO <sub>3</sub>	146	Stability Index	7.1
Hydroxides, as OH	0	Saturation Index	0.3
Carbon Dioxide, as CO <sub>2</sub>	6	Turbidity, Silica Scale	0
Carbonates, as CO <sub>3</sub>	0		
Bicarbonates, as HCO <sub>3</sub>	89		
Chlorides, as Cl	1		
Iron, as Fe	0.1		
Manganese, as Mn	0		

Signed

*J. Hobbs*  
 Chemist





TO: Jerry Crossley  
COMPANY: EPD  
FAX NUMBER: 404-651-9425  
FROM: Jackie Lawler  
PROJECT NUMBER: \_\_\_\_\_

**SENT FROM: OMI, INC.  
574 INDUSTRIAL WAY  
SWAINSBORO, GEORGIA 30401  
FAX: 1-912-237-5187**

NUMBER OF PAGES (Including this one): 3

COMMENTS: *City map to follow*

THANKS

**IF YOU DO NOT RECEIVE ALL PAGES OR IF MATERIAL IS ILLEGIBLE,  
PLEASE CALL: 912-237-6738.**

DATE SENT: 8/22/96

TIME SENT: 5:00

OPERATOR: Jackie



OPERATIONS MANAGEMENT  
INTERNATIONAL INC.

# MEMORANDUM

TO: Jerry Crosskey (OFFICE)  
\_\_\_\_\_  
(OFFICE)  
\_\_\_\_\_  
(OFFICE)  
\_\_\_\_\_  
(OFFICE)

FROM: Don Lawson (OFFICE)  
DATE: 8/21/96  
SUBJECT: Address of water wells in  
Subsidiary, Ga.

Well #1 & 2 - Moring St. (abandoned)

well #4 - Kite Rd -

well #5 - S. Circle Drive - Tank only -  
well abandoned

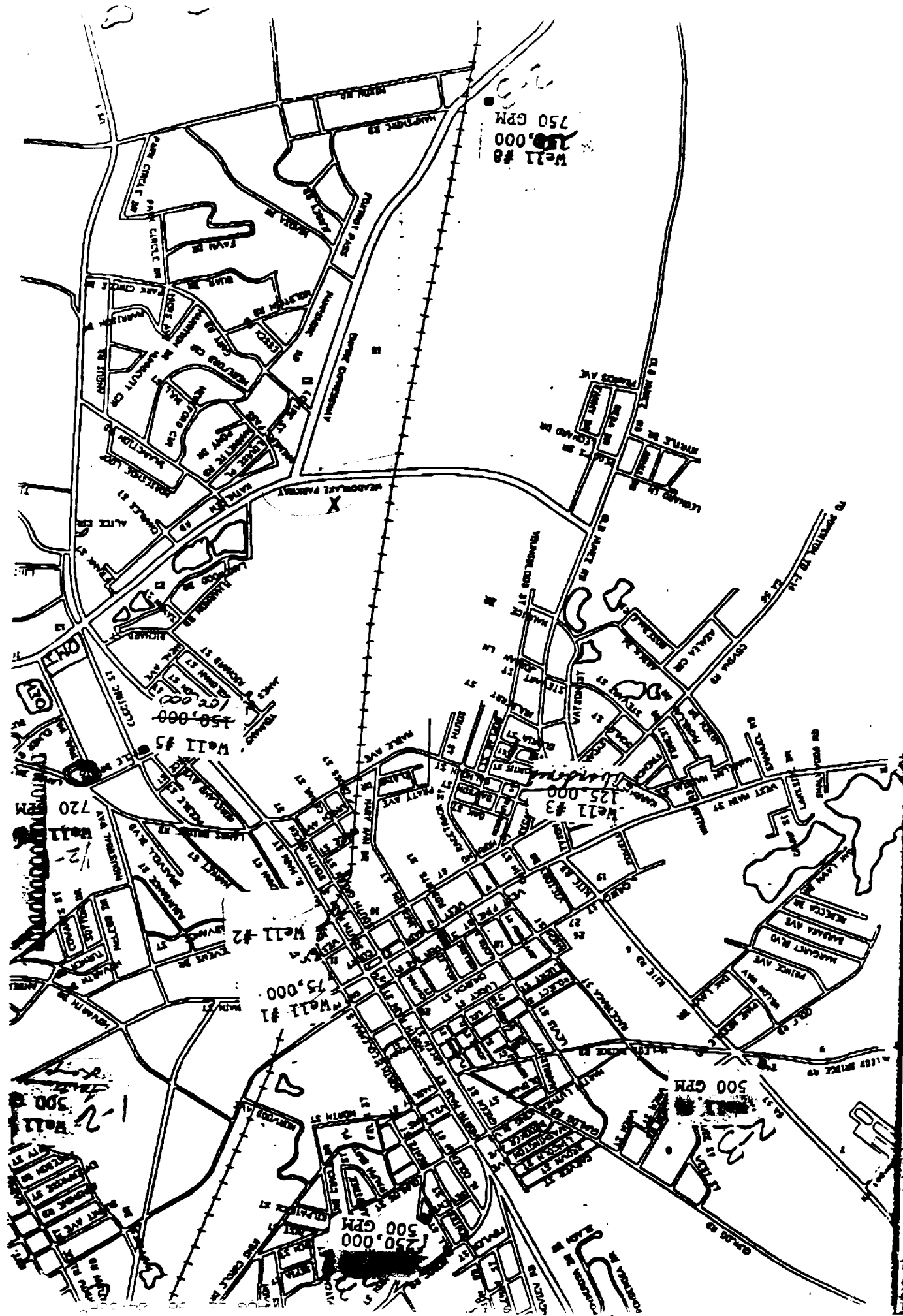
well #6 - Industrial way &  
South Circle Dr.

well #7 - Fortune loop

\* well #8 - Empire expressway

well #9 - Lerty & Hill St.

Thank you,  
John



Well #1  
750 GPM

Well #2  
75,000

Well #3  
125,000

Well #4  
500 GPM

Well #5  
720

Well #6  
500 GPM

# FROST ASSOCIATES

P.O. Box 495, Essex, Connecticut 06426  
(860) 767-7644 FAX (860) 767-1971

February 12, 1996

To: Environmental Protection Division  
205 Butler St., Floyd Towers East, Suite 1154  
Atlanta, GA 30334

Attn: James Ussery

Fr: Frost Associates  
P.O. Box 495  
Essex, Conn 06426

Tel: (203) 767-1254  
Fax: (203) 767-7069

Sub: Figgie Fire Systems

CERCLIS:

Job:

Site Longitude: 82-18-47 82.313057  
Site Latitude : 32-34-54 32.581669

The CENTRACTS report below identifies the population, households, and private water wells of each Block Group that lies within, or partially within, the 4, 3, 2, 1, .5, and .25, mile "rings" of the latitude and longitude coordinates above. CENTRACTS may have up to ten radii of any length. 1000 block groups, and 15000 block group sides.

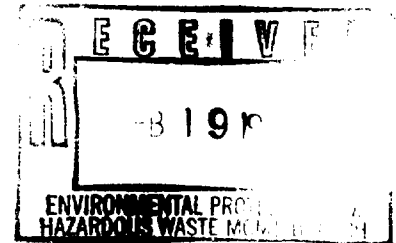
CENTRACTS uses the 1990 Block Group population and Block Group house count data found in the Census Bureau's 1990 STF-1A files. The sources of water supply data are from the Bureau's 1990 STF-3A files. The boundary line coordinates of the Block Groups were extracted from the Census Bureau's 1990 TIGER/Line Files.

CENTRACTS reports are created with programs written by Frost Associates, P.O. Box 495, Essex, Conn. The code was written using Microsoft's Quick-Basic Ver. 4.5.

Latitude and Longitude coordinates identifying a site are entered in degrees and decimal degrees. One or more county files holding Block Group boundary lines are selected for use by CENTRACTS by determining whether the site coordinates fall within the minimum and maximum Lat\Lon coordinates of each county in the state.

Each Block Group line segment has Lat\Lon coordinates representing the "From" and "To" ends of that line. All coordinates from the selected county files are read and converted from degrees, decimal degrees to X\Y miles from the site location. Each line segment is then examined whether it lies within or partially within the maximum ring from the site.

The unique Block Group ID numbers of each line segment that lie within the maximum ring are retained. All Block Group boundary lines matching the Block Group numbers are then extracted from the respective county files to obtain all sides of the included Block Groups. Boundary records are then sorted in adjacent side order to determine the shape and area of each Block Group polygon.



A method to solve for the area of a polygon is to take one-half the sum of the products obtained by multiplying each X-coordinate by the difference between the adjacent Y-coordinates. For a polygon with coordinates at adjacent angles A, B, C, D, and E. The formula can be expressed:

$$\text{Area} = 1/2 \{ X_a(Y_e - Y_b) + X_b(Y_a - Y_c) + X_c(Y_b - Y_d) + X_d(Y_c - Y_e) + X_e(Y_d - Y_a) \}$$

For each ring, the selected Block Groups will be inside, outside, or intersected by the ring. When a polygon is intersected, the partial Block Group area within that ring is calculated using the method described below.

When a ring intersects a Block Group, the intersect points are solved and plotted at the points where the ring enters and exits the shape. The chord line, a line within the circle connecting the intersect points is determined. This chord line is used to calculate the segment area, the half moon shape between the chord line and the ring, and the sub-polygon created by the chord line and the Block Group boundaries that lie outside the ring.

The segment area is subtracted from the sub-polygon area to determine the area of the sub-polygon outside the ring. The area outside the ring is then subtracted from the area of the entire polygon to arrive at the inside area. This inside area is then divided by the tract's total area to determine the percentage of area within the ring. This process is repeated for each block group that is intersected by one of the rings. The total area, partial area, and percentage of partial area of those block groups within, or partially within a ring, are held in memory for the report.

On occasion, the algorithm described above is unable to determine the area of the partial area. Within the report program is a "Paint" routine which allows an enclosed shape to be highlighted. Another routine calculates the percentage of highlighted screen pixels to the pixels within the polygon. A manual entry is allowed. Both the "paint" method and manual entry method override the calculated method.

CENTRACTS lists, starting on page 4, all Block Groups in State, County, Census Tract, and Block Group ID order that lie within, or partially within, the maximum ring. Each Block Group is identified by a City or Town name and by the Block Group's State, County, Tract and Block Group ID number. Following is the Block Group's 1990 population and house count extracted from the Census Bureau's 1990 STF-1A files.

The next four columns display water source data from the 1990 STF-3A files. The first column is "Units with Public system or private company source of water", followed by "Units with individual well, Drilled, source of water"; "Units with individual well, Dug, source of water" and "Units with Other source of water".

For each ring, CENTRACTS then shows the Block Groups that are within that ring, the Block Group's total area in square miles, the partial area of the Block Group within that ring, and the partial percentage within the ring. The areas of the included Block Group and the partial areas are then totaled.

The last section tallies the demographic data within each ring. The percentage of area for each Block Group is multiplied times the census data for that Block Group and totaled for all Block Group's within the ring. Ring totals are then determined by subtracting the three mile data from the four mile, the two mile from the three mile, one from the two, etc... Population on private wells is calculated using the formula:  $((\text{Drilled} + \text{Dug Wells}) / \text{Households}) * \text{Population}$

Figgie Fire Systems

No.	City	Block Group ID	Blk Grp People	House Holds	Public Water	Drilled Wells	Dug Wells	Other
1	Twin City	13107 9801	3 1438	516	327	163	29	0
2	Twin City	13107 9801	4 1068	420	233	127	26	0
3	Swainsboro	13107 9803	1 939	381	153	157	42	36
4	Swainsboro	13107 9803	2 1151	477	260	219	6	0
5	Swainsboro	13107 9803	3 1134	401	396	25	0	0
6	Swainsboro	13107 9804	1 1314	455	201	228	22	0
7	Swainsboro	13107 9804	2 753	368	360	0	0	0
8	Swainsboro	13107 9804	3 970	397	393	0	0	0
9	Swainsboro	13107 9804	4 1353	529	309	215	7	0
10	Swainsboro	13107 9806	1 1292	496	438	71	0	0
11	Swainsboro	13107 9806	2 1311	556	533	8	0	0
12	Swainsboro	13107 9806	3 1060	389	214	154	0	0
13	Swainsboro	13107 9806	4 874	353	126	218	14	0
=====			=====	=====	=====	=====	=====	
Totals:			14657	5738	3943	1585	146	36

Figgie Fire Systems

City	Census Tract ID	Tract People	House Count	Public Water	Drilled Wells	Dug Wells	Other Sources	
Swainsboro	13107 9804	2	753	368	360	0	0	
Swainsboro	13107 9804	3	970	397	393	0	0	
Swainsboro	13107 9803	1	939	381	153	157	42	36
Swainsboro	13107 9803	2	1151	477	260	219	6	0
Swainsboro	13107 9803	3	1134	401	396	25	0	0
Swainsboro	13107 9804	1	1314	455	201	228	22	0
Swainsboro	13107 9806	4	874	353	126	218	14	0
Swainsboro	13107 9806	2	1311	556	533	8	0	0
Swainsboro	13107 9804	4	1353	529	309	215	7	0
Swainsboro	13107 9806	1	1292	496	438	71	0	0
Swainsboro	13107 9806	3	1060	389	214	154	0	0
Sub Totals:		12151	4802	3383	1295	91	36	
Twin City	13107 9801	4	1068	420	233	127	26	0
Twin City	13107 9801	3	1438	516	327	163	29	0
Sub Totals:		2506	936	560	290	55	0	

# Figgie Fire Systems

For Radius of 4 Mi., Circle Area = 50.265482

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Twin City	13107 98013	32.522133	3.105329	9.55
2	Twin City	13107 98014	61.382973	1.071905	1.75
3	Swainsboro	13107 98031	38.067539	7.652060	20.10
4	Swainsboro	13107 98032	17.251879	2.013726	11.67
5	Swainsboro	13107 98033	1.341676	1.341676	100.00
6	Swainsboro	13107 98041	43.415855	2.209662	5.09
7	Swainsboro	13107 98042	0.235227	0.235227	100.00
8	Swainsboro	13107 98043	0.517354	0.517354	100.00
9	Swainsboro	13107 98044	29.103109	4.074519	14.00
10	Swainsboro	13107 98061	6.446071	6.446071	100.00
11	Swainsboro	13107 98062	1.739678	1.739678	100.00
12	Swainsboro	13107 98064	56.282803	8.868477	15.76
13	Swainsboro	13107 98063	27.400515	10.989802	40.11
Totals:			315.706818	50.265484	

For Radius of 3 Mi., Circle Area = 28.274334

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Twin City	13107 98013	32.522133	0.558964	1.72
2	Twin City	13107 98014	61.382973	0.072919	0.12
3	Swainsboro	13107 98031	38.067539	2.989887	7.85
4	Swainsboro	13107 98032	17.251879	0.493753	2.86
5	Swainsboro	13107 98033	1.341676	1.341676	100.00
6	Swainsboro	13107 98041	43.415855	0.447231	1.03
7	Swainsboro	13107 98042	0.235227	0.235227	100.00
8	Swainsboro	13107 98043	0.517354	0.517354	100.00
9	Swainsboro	13107 98044	29.103109	1.302544	4.48
10	Swainsboro	13107 98061	6.446071	6.291736	97.61
11	Swainsboro	13107 98062	1.739678	1.739678	100.00
12	Swainsboro	13107 98064	56.282803	4.261352	7.57
13	Swainsboro	13107 98063	27.400515	8.022015	29.28
Totals:			315.706818	28.274334	

For Radius of 2 Mi., Circle Area = 12.566371

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
3	Swainsboro	13107 98031	38.067539	0.578813	1.52
5	Swainsboro	13107 98033	1.341676	0.461952	34.43
7	Swainsboro	13107 98042	0.235227	0.163584	69.54
8	Swainsboro	13107 98043	0.517354	0.111004	21.46
9	Swainsboro	13107 98044	29.103109	0.010086	0.03
10	Swainsboro	13107 98061	6.446071	4.066038	63.08
11	Swainsboro	13107 98062	1.739678	1.671525	96.08



# Figgie Fire Systems

12 Swainsboro	13107 98064	56.282803	0.765322	1.36
13 Swainsboro	13107 98063	27.400515	4.738047	17.29
===	=====	=====	=====	=====
Totals:		161.133957	12.566370	

For Radius of 1 Mi., Circle Area = 3.141593

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
10 Swainsboro		13107 98061	6.446071	1.288615	19.99
11 Swainsboro		13107 98062	1.739678	0.426185	24.50
13 Swainsboro		13107 98063	27.400515	1.426792	5.21
===	=====	=====	=====	=====	=====
Totals:			35.586266	3.141593	

For Radius of .5 Mi., Circle Area = 0.785398

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
10 Swainsboro		13107 98061	6.446071	0.111111	1.72
11 Swainsboro		13107 98062	1.739678	0.048018	2.76
13 Swainsboro		13107 98063	27.400515	0.626269	2.29
===	=====	=====	=====	=====	=====
Totals:			35.586266	0.785398	

For Radius of .25 Mi., Circle Area = 0.196350

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
13 Swainsboro		13107 98063	27.400515	0.196350	0.72
===	=====	=====	=====	=====	=====
Totals:			27.400515	0.196350	

# Figgie Fire Systems

## ==== Site Data =====

Population:	6758.22
Households:	2715.73
Drilled Wells:	316.72
Dug Wells:	16.67
Other Water Sources:	7.24

## ==== Partial (RING) data =====

---- Within Ring: 4 Mile(s) and 3 Mile(s) ----

Population:	745.88
Households:	287.68
Drilled Wells:	119.31
Dug Wells:	11.07
Other Water Sources:	4.41

\*\* Population On Private Wells: 338.04

---- Within Ring: 3 Mile(s) and 2 Mile(s) ----

Population:	2605.58
Households:	1023.75
Drilled Wells:	104.28
Dug Wells:	4.77
Other Water Sources:	2.28

~ \*\* Population On Private Wells: 277.54

---- Within Ring: 2 Mile(s) and 1 Mile(s) ----

Population:	2772.12
Households:	1148.68
Drilled Wells:	68.96
Dug Wells:	0.83
Other Water Sources:	0.55

\*\* Population On Private Wells: 168.44

---- Within Ring: 1 Mile(s) and .5 Mile(s) ----

Population:	551.96
Households:	222.83
Drilled Wells:	19.21
Dug Wells:	0.00
Other Water Sources:	0.00

\*\* Population On Private Wells: 47.58

# Figgie Fire Systems

---- Within Ring: .5 Mile(s) and .25 Mile(s) ----

Population:	75.09
Households:	30.00
Drilled Wells:	3.86
Dug Wells:	0.00
Other Water Sources:	0.00

\*\* Population On Private Wells: 9.66

---- Within Ring: .25 Mile(s) and 0 Mile(s) ----

Population:	7.60
Households:	2.79
Drilled Wells:	1.10
Dug Wells:	0.00
Other Water Sources:	0.00

\*\* Population On Private Wells: 3.01

\*\* Total Population On Private Wells: 844.27

**OVERSIZED**  
**DOCUMENT**

# Protected Plants of Georgia

AN INFORMATION MANUAL ON PLANTS DESIGNATED BY THE STATE OF  
GEORGIA AS ENDANGERED, THREATENED, RARE, OR UNUSUAL

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Thomas S. Patrick  
James R. Allison  
Gregory A. Krakow

1995

Georgia Department of Natural Resources  
Lonice C. Barrett, Commissioner  
Wildlife Resources Division  
David Waller, Director  
Georgia Natural Heritage Program  
John R. Bozeman, Program Manager

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**LEGAL STATUS:**

State: RARE

Federal: CANDIDATE

**SYNONYMY:** None in current usage.

**RANGE:** Coastal Plain from southeastern and southcentral Georgia into northern Florida, much less frequent to possibly extirpated on the Florida Panhandle and adjacent Alabama, and disjunct in northeastern South Carolina. Recorded from 21 counties in Georgia, including an ambiguous report from Berrien County (see map).

**ILLUSTRATION:** (A) stem, lower portion, with numerous leaves, the lowermost with long-tapered bases, 0.5 ×; (B) stem, upper portion, with few leaves, 0.5 ×; note flower heads with toothed rays; (C) flower head, in fruit, with honeycomb pattern, 1 ×. Source: original drawing by Vicky Holifield.

**DESCRIPTION:** Perennial herb. The plant reaches a height of 0.8–1.2 m, producing a single, erect stem, sometimes with 2–5 or more branches, each with a single, large flower head. The main stem is purplish and grooved near the base, and

occasionally has minute hairs toward the top. The leaves are clustered low on the stem, well-spaced and alternate higher on the stem. The lower leaves are linear-spatulate (narrowly spoon-shaped), 7–30 cm long, about 1 cm wide, and short-stalked; the upper leaves are smaller, narrower, 3–7 cm long, 0.3–0.8 cm wide, and stalkless (sessile). The flowers are arranged in showy, sunflower-like heads. Each of the 10–15 rays is deep yellow, 3–5-toothed at the apex, nearly 3.5 cm long, and about 0.5 cm wide. The disk flowers are burgundy-purple. The structure to which the individual flowers of the head are attached (receptacle) forms a honeycomb-like head in fruit. The fruit is an achene, borne singly in each 5–6-sided cell of the “honeycomb.” Each achene is top-shaped (turbinate), hairy, 1.5–2.2 mm long, nearly 1 mm wide, and capped by a ring of 10–12 scales. Flowering period: late August to October; fruiting period: October to December. Best search time: during flowering, since flowering heads are showy, easily observed, and exhibit the diagnostic burgundy-purple center composed of disk flowers.

**HABITAT:** Found in wetter areas of peaty pitcherplant bogs and pine savannas. Common associates include cowbane (*Oxypolis filiformis* or *O. ternata*), St. John’s-worts (*Hypericum brachyphyllum*, *H. cistifolium*, and/or *H. galioides*), yellow honeycomb head (*Balduina uniflora*), and pitcherplants (especially *Sarracenia flava*, *S. minor*, and *S. psittacina*).

**SPECIAL IDENTIFICATION FEATURES:** Only two species of *Balduina* are likely to be found in moist habitats. *Balduina uniflora* has greenish stem bases, usually only one or two flowering branches, and yellow disk flowers. In contrast, *B. atropurpurea* has reddish stem bases, multiple flowering branches in robust specimens, and purple disk flowers. *Balduina atropurpurea* tends to bloom two or three weeks later than *B. uniflora*. The leaves and fruiting heads are nearly identical in the two species. There are no other composites (members of the aster family) in which the fruiting head becomes a hardened, globose, “honeycomb.” However, there are other composites with strongly toothed, yellow rays and dark disk flowers. These are the sneezeweeds (*Helenium brevifolium* and *H. flexuosum*), both with winged stems; the Indian blankets or fire wheels (*Gaillardia*, especially *G. aestivalis*); and the bog tickseed (*Coreopsis gladiata*). *Gaillardia* is distinguished from *Balduina* by shorter rays (usually up to 2 cm long in *Gaillardia*, over 3 cm long in *Balduina*). *Coreopsis* has fewer rays per flower head

(normally only 5–8 in *Coreopsis*, while there are 10–15 in *Balduina*).

**MANAGEMENT RECOMMENDATIONS:** Control encroachment of woody vegetation through controlled burning. Avoid drainage of site and other impacts to hydrology, such as those resulting from improper firebreak construction. Hand thinning of shading trees may be beneficial to this species.

**REMARKS:** This species was first collected in 1900, in present-day Tift County, by Roland Harper (1878–1966). Harper made extensive collections in the state at the beginning of the 20th century, discovering many state records and a sizeable number of new species. The genus *Balduina* consists of only three species, all endemic to the southern United States. *Balduina atropurpurea* is rare throughout its range, and has sustained significant habitat loss due to fire suppression and to draining of its habitat for conversion to agricultural land.

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Rosemary, Sandhill Rosemary

Crowberry Family, EMPETRACEAE

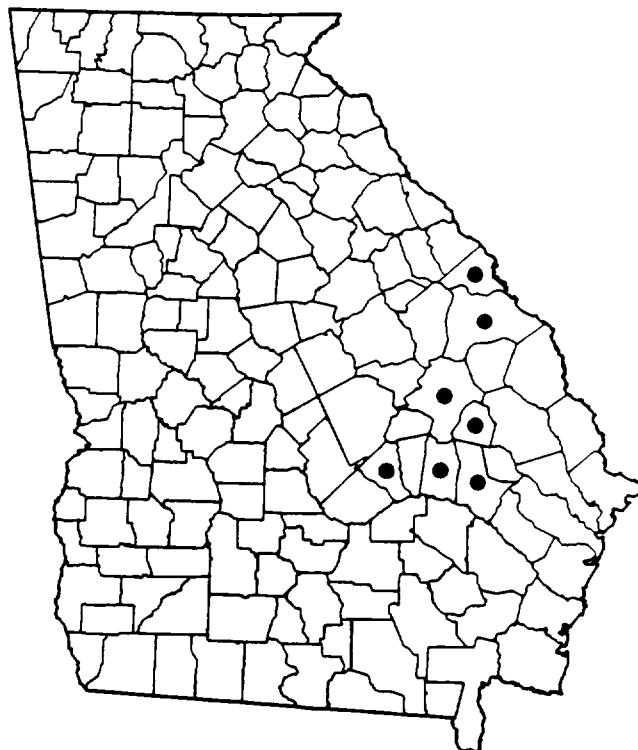
**LEGAL STATUS:**

State: THREATENED

Federal: None

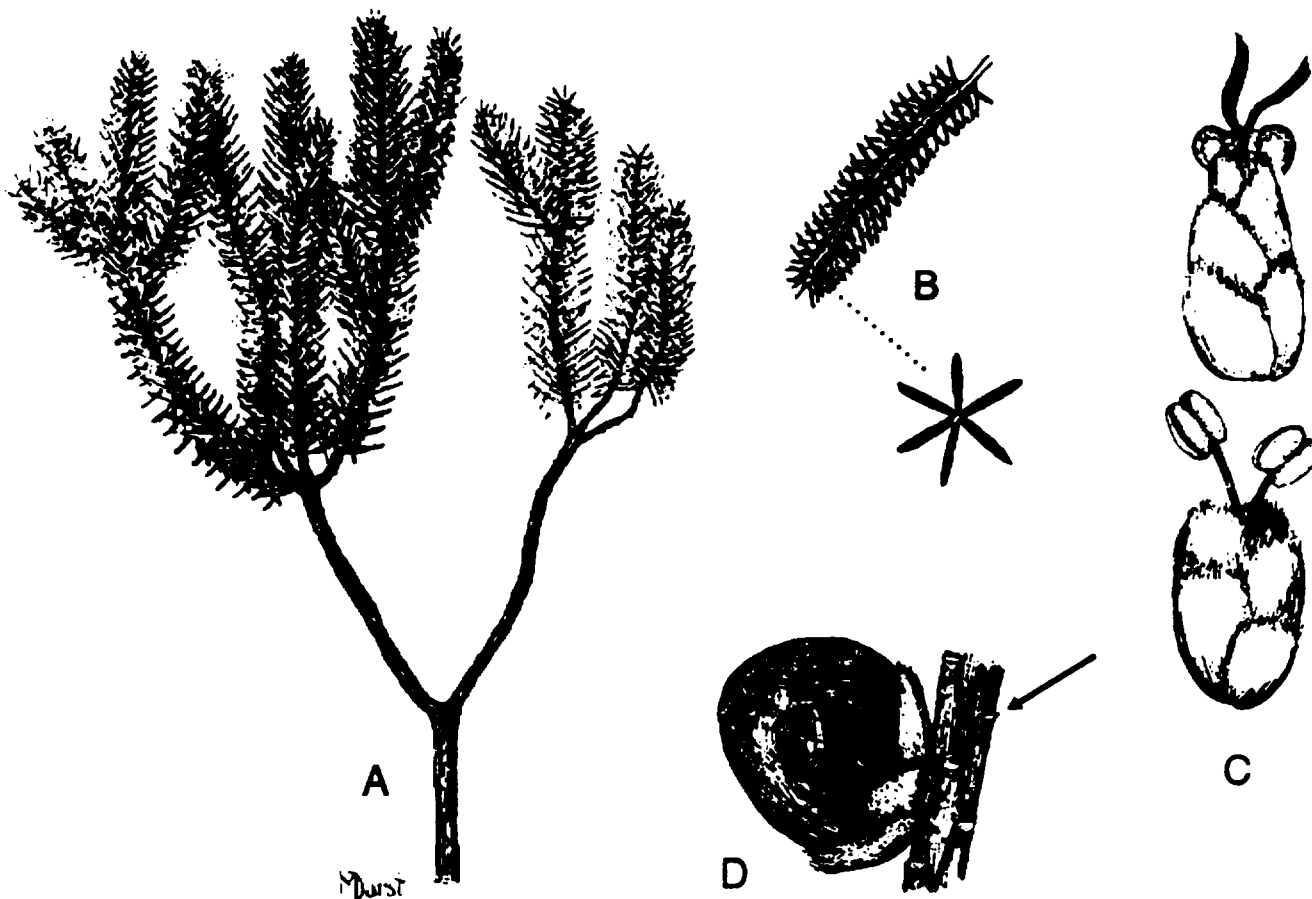
**SYNONYMY:** None in current usage.

**RANGE:** Coastal Plain from Mississippi to South Carolina, found mostly on coastal dunes, but also inland on the Florida Peninsula, river dunes and sand ridges in southeastern Georgia, and on sandhills along the Fall Line in eastcentral Georgia and South Carolina. Recorded from seven counties in Georgia (see map).



**ILLUSTRATION:** (A) branch habit, 0.7 $\times$ ; (B) branchlet, with diagrammatic cross section, showing leaf arrangement, 0.8 $\times$ ; (C) male (below) and female (above) flowers, 10 $\times$ ; (D) fruit, with portion of stem, showing prominent attachment scars from fallen leaves, 10 $\times$ . Source: Godfrey (1988), drawn by Melanie Darst and used with permission.

**DESCRIPTION:** Shrub to a height of 2.0–2.5 m, the foliage aromatic (fragrance of rosemary). The



stems are densely multi-branched, with grayish, shreddy bark; the young twigs are covered with a dense coat of gray, short, wooly hairs (tomentose). The leaves are evergreen, needle-like, 8–15 mm long, less than 1 mm wide with margins inrolled beneath (revolute), arranged in whorls of 4 or 6, giving the twigs a square or hexagonal shape when viewed endwise, each leaf appearing as a stiff tubular structure. Flowers are either male or female, borne on separate plants (dioecious), with persistent, yellowish to reddish sepals and petals, each two (rarely three) in number and about 1.5 mm long; the two stamens or two styles are long and protruding (exserted). The flowers are produced in the axils of the leaves and resemble those of myrtle or bayberry in their arrangement near the ends of the young branches. The fruit is yellow or pinkish-red, 2–3 mm in diameter, similar to a drupe but with two stones (nutlets). Flowering period: mostly early March to June, sporadically all year, especially after a prolonged rain; fruiting period: mostly June to August, sporadically all year. Best search time: all year, since plants are evergreen.

**HABITAT:** Found on the driest, openly vegetated, scrub oak sandhills and river dunes with deep white sands of the Kershaw soil series, with woody goldenrod (*Chrysoma pauciflosculosa*) and extensive mats of lichens.

**SPECIAL IDENTIFICATION FEATURES:** Rosemary resembles no other native shrub. The evergreen, needle-like leaves give the appearance of a juniper or cedar, from a distance. The rosemary-scented leaves and the preference of the plants for openly vegetated, deep white sands are also useful in identification.

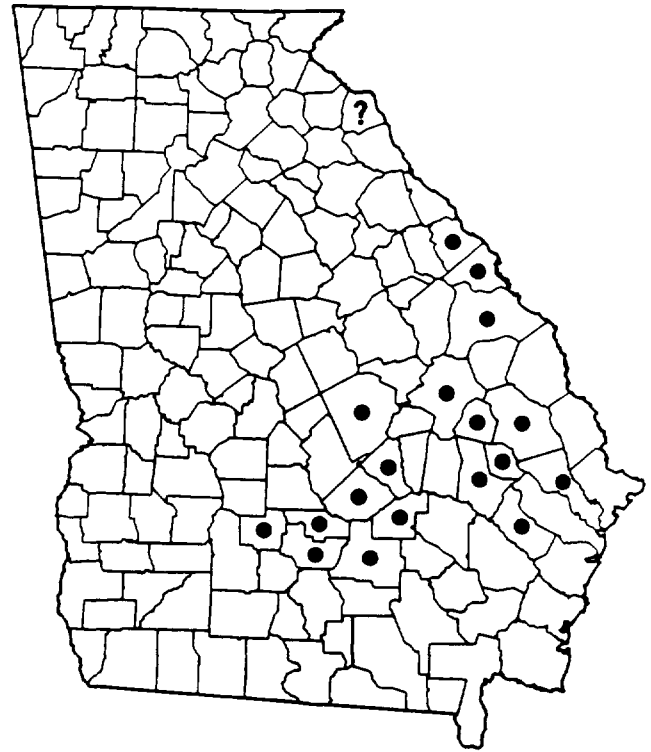
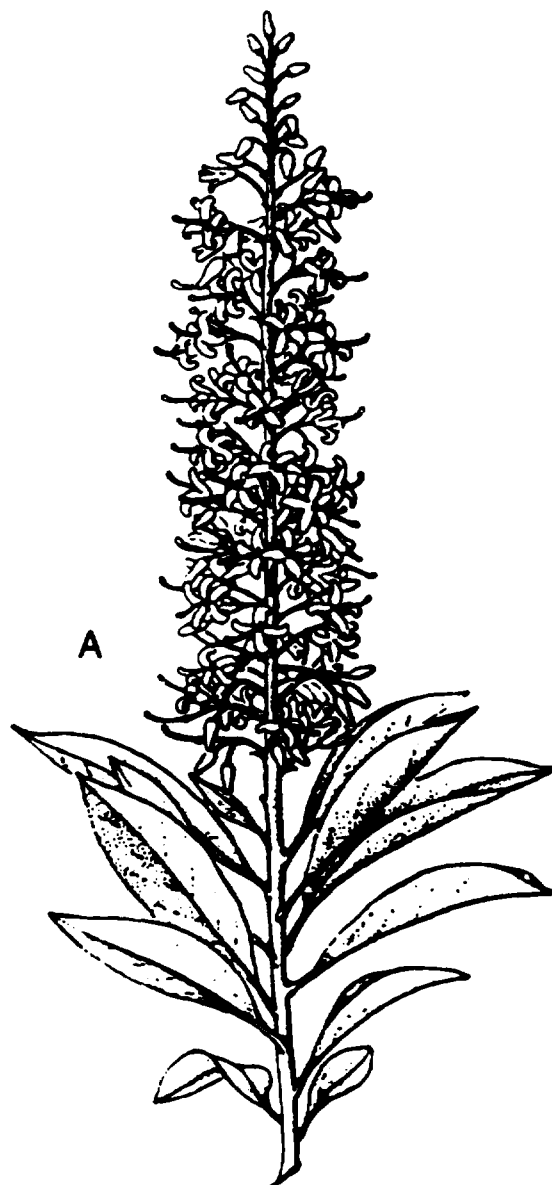
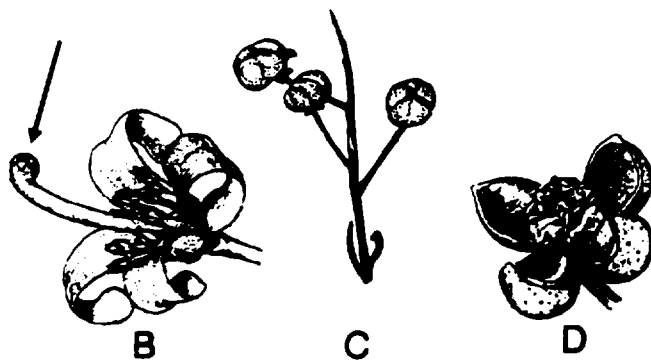
**MANAGEMENT RECOMMENDATIONS:** Controlled burning at long intervals (more than ten years) or hand thinning of shading trees in its vicinity will benefit this light-loving plant.

**REMARKS:** *Ceratiola ericoides* is the only species in its genus (monotypic genus); it has few close relatives, the family Empetraceae consisting of only five species distributed among three genera. The family is related to the Ericaceae, and its members resemble the portion of that family known as heaths, with small, close-set leaves. Some members of the Empetraceae have found limited use as rock garden subjects and the crowberry (*Empetrum nigrum*) has an edible black berry. *Ceratiola ericoides* is most abundant in areas of sandhill scrub in Florida, where it sometimes is abundant enough that the places it

inhabits are called "rosemary balds." This is a species that is found in some of Georgia's driest scrub habitats. Scrubs supporting *Ceratiola* typically have many scattered patches of bare soil that is nearly pure sand. Because the habitat is so severe, fuel (litter, biomass) is comparatively slow to accumulate. Due to the paucity of fuel and lack of continuous cover to carry wildfire over a large area, wildfires occurred historically at longer average intervals than prevailed in oak-dominated scrubs. The adaptation of *Ceratiola* to sites with fire frequency between 10 and 40 years is indicated by two observations (Johnson, 1982). First, fire is known to stimulate seed germination; second, seed production, the only means of reproduction in this species, begins when a plant reaches 10–15 years of age and declines after age 20–30. *Ceratiola ericoides* is a rare disjunct in Georgia. It has sustained significant habitat loss due to conversion of sand ridge habitat (e.g., to pine plantation or Bermuda grass pasture), and due to fire suppression.

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**LEGAL STATUS:**

State: THREATENED

Federal: None

**SYNONYMY:** None in current usage.

**RANGE:** Coastal Plain, rarely Piedmont, of Georgia; no longer found in adjacent South Carolina. Recorded from 19 counties in Georgia, including an ambiguous report from Hart County (see map).

**ILLUSTRATION:** (A) flowering twig, with long terminal "plume" of blooms, 0.5 ×; (B) flower, mature, 2 ×; note long-protruding style; (C) sparse fruits (capsules), in late summer, 1 ×; (D) open fruit, showing the four valves and winged seeds within, 1.2 ×. Source: (A, B, D) Wood (1961), drawn by Dorothy H. Marsh; (C) Harrar and Harrar (1962), drawn by Helene S. Millar; all used with permission.

**DESCRIPTION:** Deciduous small tree or shrub. Elliottia grows to 10 m or more tall; some plants have multiple trunks due to root sprouting following injury, such as from cutting or fire. The bark is gray and furrowed. The leaves are

alternate, elliptic, and 4–12 cm long, 3–5 cm wide, tapering at both ends, with a tiny (0.5 mm long) bristle at the apex, and sometimes covered with soft hairs on the underside. Produced at the ends of the higher branches, the multi-flowered, plume-shaped flower cluster is quite showy, 1.5–3.0 dm long, unbranched (racemose) or branched (paniculate) near the base, and erect. The flowers have four white petals, each 12–14 mm long, strap-shaped, and becoming recurved. The flowers have 4–10 (usually 8) stamens and a single ovary with a somewhat incurved, long-protruding style. The fruit is a globose capsule, 10–12 mm in diameter, opening by 4–5 valves, exposing up to about 40, flattened, marginally winged, light-brown seeds, each 3–4 mm long. Flowering period: June to July, sporadically to September; fruiting period: July to December. Best search time: during flowering, since plants are most conspicuous when in flower.

**HABITAT:** Found on sand ridges, dry oak ridges, evergreen hammocks, and sandstone outcrops (Altamaha Grit) in a variety of sandy soil conditions ranging from moist to extremely dry (xeric).

**SPECIAL IDENTIFICATION FEATURES:** In its tree form, Georgia plume resembles sourwood (*Oxydendrum arboreum*) with its furrowed bark, terminal clusters of white blooms, and similar leaves. *Elliottia* flowers are 4-parted, the strap-shaped petals are separate and the style long-protruding. Sourwood, on the other hand, has urn-shaped flowers, 5-parted, with petals united. *Elliottia* leaves have entire margins, undersides are smooth or softly hairy with smooth central veins, and tips have tiny bristles. In contrast, sourwood leaves have toothed margins, undersides are smooth with long, stiff hairs on the central veins, and tips are without bristles. In its shrub form, Georgia plume vegetatively resembles horse-sugar (*Symplocos tinctoria*). Horse-sugar has sweet-tasting, rather fleshy leaves on stout twigs (the twig pith is divided into chambers). Georgia plume has bitter-tasting, thinner leaves on narrower, somewhat 3-angled twigs (the twig pith is solid).

**MANAGEMENT RECOMMENDATIONS:** At the moister sites, hand thinning of shading trees in its vicinity and controlled burning at long intervals may be beneficial to this species.

**REMARKS:** The famed naturalist William Bartram (1739–1823) observed and collected this species in 1773, somewhere near the Savannah River in Georgia. Based on an interpretation of Bartram's "Travels," it has been suggested that he saw it in

present-day Hart County, well removed from any populations known today. It was not collected again until about 1808, when Stephen Elliott found it near Waynesboro (Burke County). Henry Muhlenberg named the genus in Elliott's honor in 1810, for Bartram's earlier specimen lay unnoticed in the British Museum. Allegedly *Elliottia* occurred at two places in South Carolina, but these reports may have been based on transplanted material. Although it persisted in cultivation, no wild populations were known to science after about 1875 until 1901, when J. Walter Hendricks and Roland Harper rediscovered it in present-day Candler County. It has since been found at about three dozen other locations, all in Georgia. *Elliottia* was formerly considered to contain a single species, *E. racemosa*, until Bohm et al. (1978) transferred the solitary species of *Cladothamnus* (of the Pacific Northwest) and the two species of *Tripetaleia* (Japan) into this genus. *Elliottia racemosa* is rare throughout its limited range, and has sustained significant habitat loss due to clearing of forest land for conversion to agricultural land or pine plantation.

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Dwarf Witch-alder

Witch-hazel Family, HAMMAMELIDACEAE

**LEGAL STATUS:**

State: THREATENED

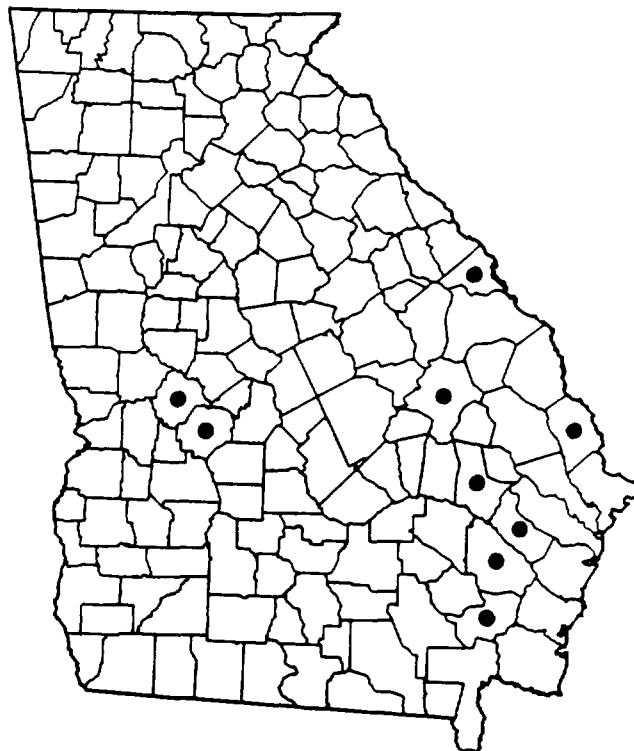
Federal: None

**SYNONYMY:** None in current usage.

**RANGE:** Coastal Plain from Alabama and Panhandle Florida to North Carolina. Recorded from nine counties in Georgia (see map).

**ILLUSTRATION:** Flowering branch superimposed on fruiting one, 1×; note fruit cluster. Source: Bailey (1929), drawn by Charles Edward Faxon and used with permission.

**DESCRIPTION:** Deciduous shrub. Dwarf witch-alder is a small shrub 0.3–1.0 m tall, forming dense clumps. The leaves are alternate, obovate to rounded, covered with star-shaped (branched) hairs, which are most prevalent on the undersides. The leaf margins are wavy (sinuate) and have a few rounded teeth toward the apex. The expanded portion of the leaf is 2–6 cm long and 1.5–4.0 cm wide; the leafstalk is short (under 1 cm long).



The flowers are either male or female, arranged in dense, terminal spikes, and are without petals. Only the male flowers are showy, having numerous, long, pure white stamens, forming en masse a miniature bottlebrush (see illustration). The fruit is a capsule, 7–10 mm long, densely hairy, ovoid, opening into two valves, each with a prominent beak (persistent style) and containing a single, shiny, brownish-black, oblong seed that is 5.0–5.5 mm long. Flowering period: March to April; fruiting period: August to October. Best search time: during flowering (prior to leaf emergence) or during peak of fall foliage coloration (late October), since leaves turn a mixture of orange, yellow and scarlet in the fall.

**HABITAT:** Found in low, flat, swampy areas, especially the shrub-dominated margins of upland swamps (pocosins), Carolina bays, pitcherplant bogs, wet savannas, and Atlantic white-cedar (*Chamaecyparis thyoides*) swamps.

**SPECIAL IDENTIFICATION FEATURES:** Dwarf witch-alder occurs in damp habitats, usually wetlands, produces numerous, white, bottlebrush-like blooms in early spring, has flowers without petals, is normally a colonial shrub less than 1 m tall, and has small leaves (only 3–4 cm wide), with wavy (sinuate or undulate) margins having a few rounded teeth near the apex. In contrast, its near relative, witch hazel (*Hamamelis virginiana*), occurs in dryish to moist woods, produces a few, yellowish-red blooms in autumn, has flowers with 4, strap-shaped petals, is a large, non-colonial shrub or small tree, and has larger leaves (commonly 5–8 cm wide) with wavy (sinuate or undulate) margins without teeth.

**MANAGEMENT RECOMMENDATIONS:** Avoid drainage of site. Limit encroachment of woody vegetation by controlled burning.

**REMARKS:** Johann Murray named the genus *Fothergilla* in honor of John Fothergill (1712–1780), a London medical doctor, botanist, and patron of some early American botanists. He named the present species for its discoverer, Alexander Garden (1730–1791), a Scottish-born doctor and plant collector who lived in Charleston, South Carolina from 1752 to 1783. This species and the more common *F. major* are the only members of the genus, which is restricted to the Southeast. The most closely related plant is probably *Parrotiopsis*, a monotypic genus of Kashmir and Afghanistan. Charles Sargent made the first Georgia collection of *F. gardenii* in 1900, near Augusta. It has since been found in about ten

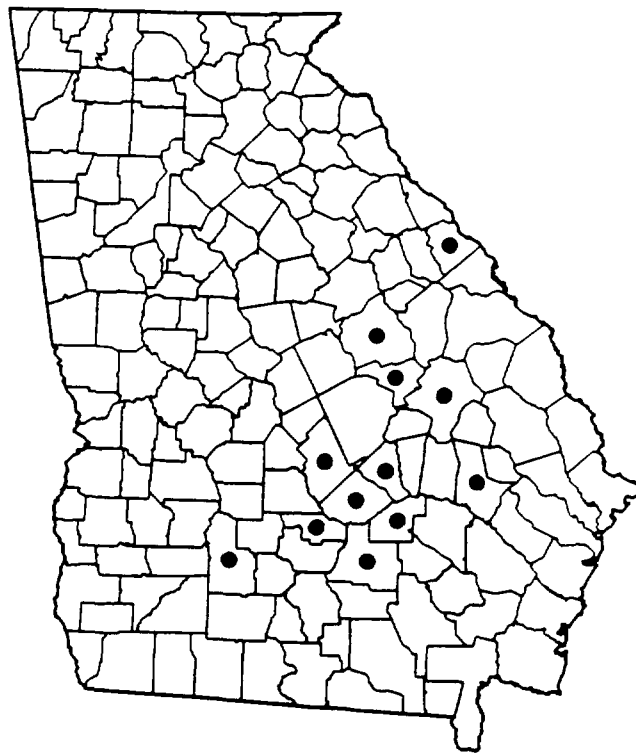
other locations in the state. It is rare throughout its range.

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Pineland Barbara Buttons, Pine Barrens Barbara Buttons

Aster Family, ASTERACEAE



**LEGAL STATUS:**

State: RARE

Federal: CANDIDATE

**SYNONYMY:** None in current usage.

**RANGE:** Mostly on the Coastal Plain of Georgia; disjunct at one site on the Florida Panhandle, and on Burks Mountain on the Piedmont in Columbia County, Georgia. Recorded from 12 counties in Georgia (see map).

**ILLUSTRATION:** Plant habit; note basally disposed leaves and multiple flower heads, 0.5 x . Source: original drawing by Vicky Holifield.

**DESCRIPTION:** Perennial herb. The stems are usually clumped, branched and 4–6 dm tall. The leaves are either linear, narrowly elliptic or oblanceolate, 8–20 cm long, up to 1.5 cm wide, and 3-nerved. The larger and longer-stalked leaves are near the stem base. The leafstalks tend to be purplish. The flowers are in terminal, flat-topped clusters of usually 4–12 heads, each 1.5–2.0 cm wide, subtended by numerous, rounded to minutely pointed bracts, and composed only of tubular flowers (disk flowers). The disk flowers

are pale rose to white, each subtended by a single, persistent, rounded to minutely pointed, scale-like bract (chaff). The fruit is a 5-angled, 10-ribbed achene, about 2 mm long, with a hairy surface. The fruits are topped by a crown (pappus) of five, narrowly triangular, sharply pointed scales, which are 1.0–1.5 mm long. The fruits are found among the many bracts (chaff), which persist on the flower head. Flowering period: mid-May to June, sporadically into July during wet summers; fruiting period: July to September. Best search time: during flowering, since the plants are less conspicuous during fruiting.

**HABITAT:** Found in open, mixed oak-longleaf pine forests in thin soils on and near rock outcrops, particularly of the Altamaha Formation found on the Inner Coastal Plain. The Altamaha Grit, as this rock type is often called, is a coarse, gritty sandstone-like, indurated (hardened) clay. Plants are also found on serpentine-like rock outcrops, which are rich in magnesium, as on Burks Mountain in Columbia Co.

**SPECIAL IDENTIFICATION FEATURES:** *Marshallia ramosa* has a small stature (usually under 6 dm tall) with usually 4–12 heads per plant, and has flowers in relatively small heads (under 2 cm broad). In contrast, the more common species, *Marshallia tenuifolia* (*M. graminifolia* subsp. *tenuifolia*), has a taller stature (nearly 1 m tall) with numerous, long-tapered (grasslike) leaves, and flowers in larger (2–3 cm broad) heads. In addition, *M. tenuifolia* blooms from midsummer into fall, while *M. ramosa* typically blooms from late spring to early summer. A third species that occurs within the range of *M. ramosa* is *M. obovata*. It is easily distinguished by its unbranched stems that are leafless in the upper half, and a broader leaf shape (oblanceolate to elliptic).

**MANAGEMENT RECOMMENDATIONS:** Prevent encroachment of woody vegetation through controlled burning. Hand thinning of shading trees in its vicinity, if done carefully, may be beneficial to this species.

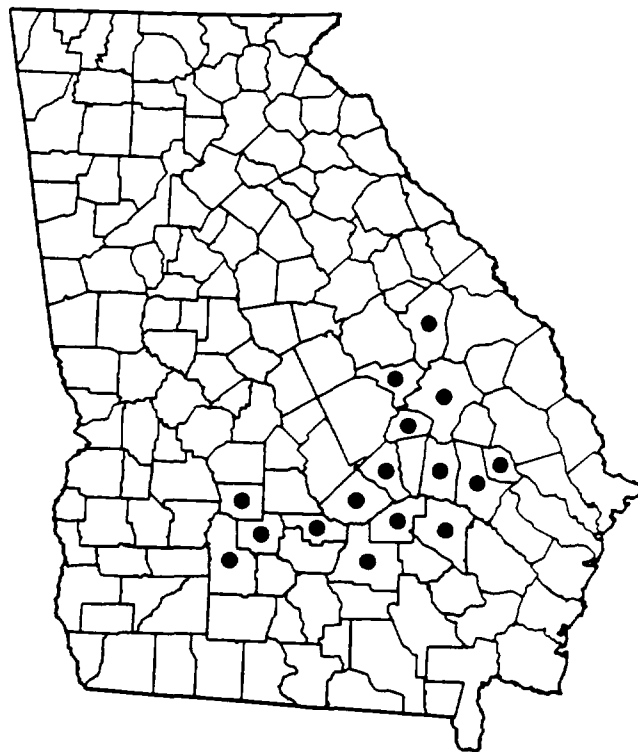
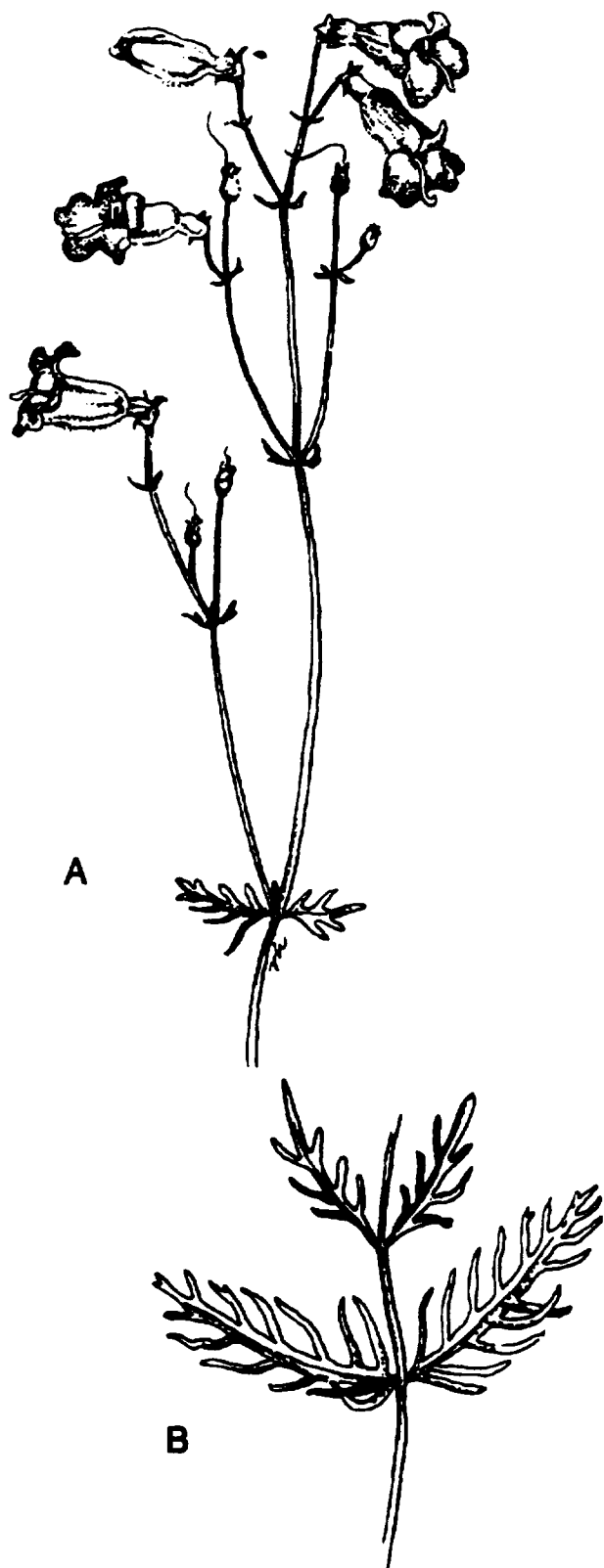
**REMARKS:** Charles Lawrence Boynton (1864–?) made the first collection of this species in 1900, near Eastman, in Dodge County. Along with *Marshallia mohrii*, Chauncey Delos Beadle and Frank Ellis Boynton described it the following year. It has since been found at about 20 locations, including a single site in Washington County, Florida. Although once described as abundant in Dodge County, it has not been reported from there

since 1903. *Marshallia ramosa* is rare throughout its limited range.

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**LEGAL STATUS:**

State: RARE

Federal: None

**SYNONYMY:** None in current usage.

**RANGE:** Coastal Plain of Georgia. Recorded from 16 counties in Georgia (see map).

**ILLUSTRATION:** (A) flowering stem, upper portion, 1 ×; (B) leaves, two pair, on lower stem, 1 ×. Source: original drawing by Vicky Holifield.

**DESCRIPTION:** Perennial herb. The stems are 1–several, often clumped, and 3–4 dm tall. Stem leaves are opposite, 1.5–5.0 cm long, 1–2 cm wide, deeply divided (dissected) into linear segments (see illustration). Basal leaves, with their margins entire to few-toothed, form a rosette that withers as the flowering shoot matures. The flowers are in branched, terminal clusters (panicles), and resemble those of snapdragons and foxgloves in shape. The five sepals are 3–4 mm long, ovate, and pointed at the apex. The corolla has an upper lip of two fused petals, and a longer lower lip of three fused petals. The corolla,

including tube and lips, is 20–25 mm long and variously shaded and striped with violet-purple. There are four fertile, non-protruding (included) stamens, and a fifth, protruding (exserted), sterile stamen (staminode), which is bearded with a tuft of yellow hairs. The fruit is an ovoid capsule with a tapered apex, and contains numerous, small, angled seeds. Flowering period: late April to May; fruiting period: late May to August. Best search time: during growing season, since the dissected stem leaves are diagnostic.

**HABITAT:** Found in dry, open, mixed oak-longleaf pine forests or on thin soils near rock outcrops of the Altamaha Formation (Altamaha Grit), a coarse, gritty, resilient, sandstone-like, indurated (hardened) clay.

**SPECIAL IDENTIFICATION FEATURES:** The beardtongues or penstemons (*Penstemon* spp.) are distinguished by a 2-lipped (bilabiate) corolla with the lower three lobes folded on the outside of the upper two lobes. The inner surface of the upper lobes bears a peculiar stamen, known as the "beardtongue" or staminode. The staminode is a sterile stamen, producing only a terminal beard of yellow hairs rather than pollen. Other genera in the figwort family have *beardless* sterile stamens. The cutleaf beardtongue is easily distinguished from other beardtongues by its deeply dissected stem leaves.

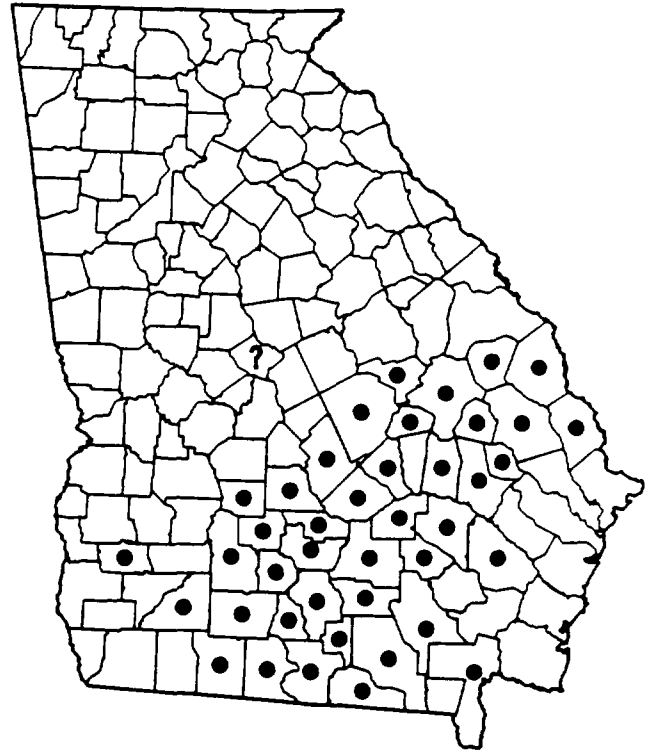
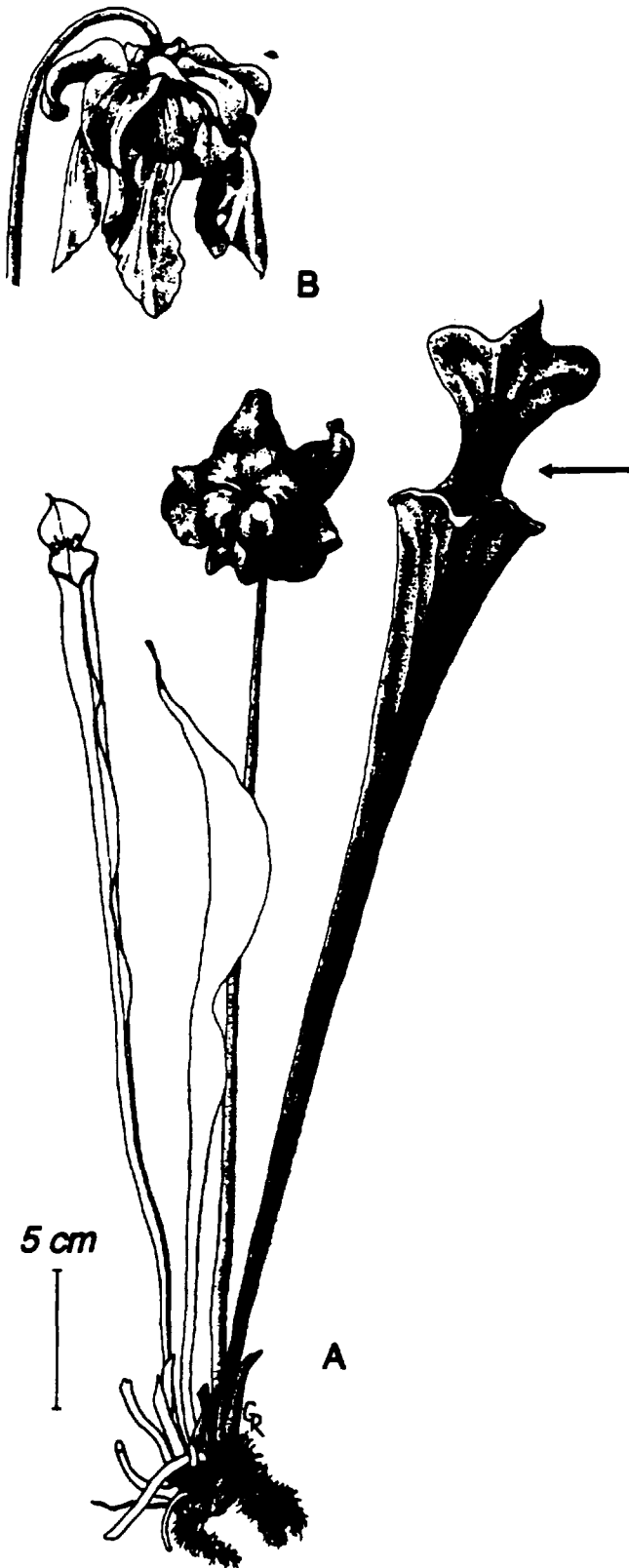
**MANAGEMENT RECOMMENDATIONS:** Control encroachment of woody vegetation through prescribed burning. Timber removal, if desired, may be beneficial to this light-loving plant.

**REMARKS:** This species was described in 1822, based on a specimen sent to Stephen Elliott from Louisville, Georgia, then the state capital. The specimen came from James Jackson, son of Governor James Jackson. This species has been found at a total of about 21 locations, all in the Altamaha Grit region of the Inner Coastal Plain of Georgia. It is unique within the genus in possessing finely dissected leaves. *Penstemon dissectus* is a Georgia endemic species that is rare throughout its geographically restricted range.

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**LEGAL STATUS:**

State: UNUSUAL

Federal: None

**SYNONYMY:** None in current usage.

**RANGE:** Coastal Plain from southeastern Mississippi to southeastern Virginia; also on the Piedmont Plateau of North Carolina and southeastern Virginia. Recorded from 42 counties in Georgia, including one possible record from Bibb County based on a sterile specimen (see map).

**ILLUSTRATION:** (A) plant habit, 0.4 $\times$ ; note pigmented band at base of hood; (B) flower, with descending petals, 0.6 $\times$ . Source: McDaniel (1971), drawn by Grady W. Reinert and used with permission.

**DESCRIPTION:** Perennial herb. *Sarracenia flava* is one of the largest members of this genus, growing to 95 cm tall. The hollow, trumpet-shaped leaves (pitchers) are greenish-yellow, 25–95 cm tall, 1–5 cm wide at the orifice, gradually narrowed to the base, and have suberect hoods with a reddish-purple splotch at the base. Flattened, sword-shaped leaves (phyllodes) are produced after

flowering; they are 12–30 cm long, and may overwinter. The flowers appear before the leaves, and are nodding and solitary on long, leafless stalks. The five sepals are green, 2.5–3.0 cm long, and persist at the base of the fruit. The five petals are bright yellow, ovate, 5.0–8.5 cm long, and quickly fall off. A distinctive characteristic of the pitcherplant flower is the umbrella-shaped style (style-disk), which is 6–8 cm in diameter in this species. The fruit is a globose capsule, 1.5–2.0 cm in diameter, with numerous seeds. Flowering period: mid-March to April; fruiting period: May to July, possibly later. Best search time: during entire growing season, especially during flowering.

**HABITAT:** Found in acidic soils of seepy meadows, bogs, wet savannas, and pine flatwoods; sometimes along sloughs and ditches.

**SPECIAL IDENTIFICATION FEATURES:** The mature leaves or pitchers are erect, broadest at the mouth, and lack the translucent “windows” found in some species. The hoods are ascending with reddish-purple banding near the base. The petal color is bright yellow.

**MANAGEMENT RECOMMENDATIONS:** Avoid drainage of site. Limit encroachment of woody vegetation by controlled burning. Timber removal, if desired, may be beneficial to this light-loving plant. Of horticultural interest: protect from removal by irresponsible persons.

**REMARKS:** The family *Sarraceniaceae* is native only to the New World. It consists of three genera: *Heliamphora*, with five species restricted to Venezuela; *Darlingtonia*, a monotypic genus of California and Oregon; and *Sarracenia*, with eight species, all but *S. purpurea* restricted to the southeastern United States. *Sarracenia flava*, especially when in bloom, is one of the showiest of the genus, a group of plants ingeniously evolved for the capture and digestion of insect prey. The inside of the vase-shaped “pitcher” has nectar-producing glands that attract insects, a slippery surface offering no foothold, and downward-pointing hairs. A portion of the inner surface also bears tiny glands that exude digestive enzymes. The naturalist Mark Catesby, who was among the earliest persons to write about the natural history of Georgia, described this species in 1731. The name given to it by Linnaeus 22 years later is the accepted name, for the scientific names given to plants prior to the publication of Linnaeus’s *Species Plantarum* (1753) are, by international agreement, disregarded. *Sarracenia*

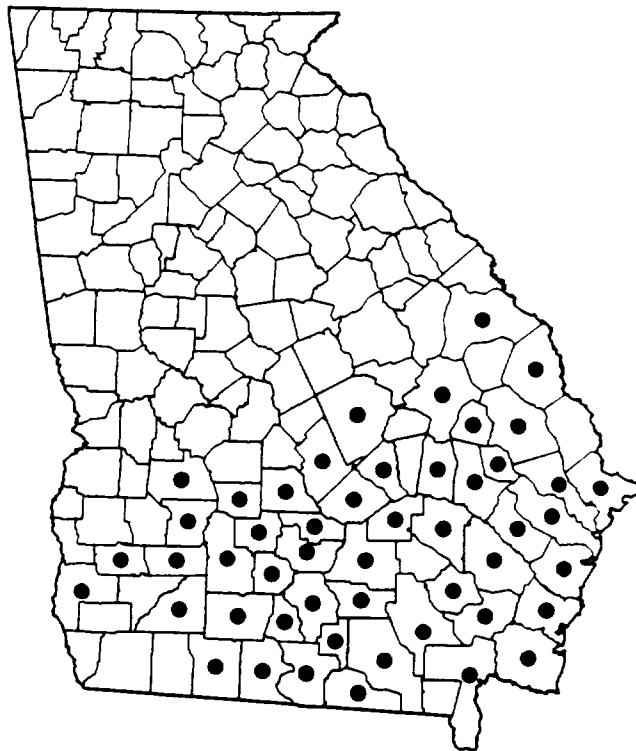
*flava* has sustained significant habitat loss due to fire suppression or draining of its habitat. It is vulnerable to excessive digging by nurserymen and gardeners.

#### SELECTED REFERENCES:

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Hooded Pitcherplant

Pitcherplant Family, SARRACENIACEAE

**LEGAL STATUS:**

State: UNUSUAL

Federal: None

**SYNONYMY:** None in current usage.**RANGE:** Coastal Plain of central Florida into Georgia, north to southeastern North Carolina. Recorded from 50 counties in Georgia (see map).**ILLUSTRATION:** Plant habit, 0.5 $\times$ ; note "windows" on back of hood. Source: McDaniel (1971), drawn by Barbara Culbertson and used with permission.**DESCRIPTION:** Perennial herb. The hooded pitcherplant is 15–60 cm tall. The hollow, trumpet-shaped leaves (pitchers) are green at the base, sometimes red above with conspicuous translucent "windows" toward the apex, 15–60 cm tall, 1–4 cm wide at the orifice, gradually narrowed to the base, and have hoods that are bent downward over the orifice. The flowers are nodding and solitary on long, leafless stalks that equal or exceed the leaves. The five sepals are greenish-yellow, 1.5–3.5 cm long, and persist at the base of the fruit. The five yellow petals are

ovate, 2.5–4.0 cm long, and quickly fall off. A distinctive characteristic of the pitcherplant flower is the umbrella-shaped style (style-disk), which is 2–3 cm in diameter in this species. The fruit is a globose capsule, 0.8–1.8 cm in diameter, with numerous seeds. **Flowering period:** March to May; **fruiting period:** June to July, or later. **Best search time:** during entire growing season, especially during flowering.

**HABITAT:** Found in acidic soils of open bogs, wet savannas, pond margins, low areas in pine flatwoods, sphagnum seeps of red maple-black-gum swamps, and along sloughs and ditches.

**SPECIAL IDENTIFICATION FEATURES:** The mature leaves or pitchers are erect, broadest at the mouth, and have translucent "windows" near the apex, especially on the backs of the hoods, which are bent so that they nearly close the orifice. The petal color is yellow.

**MANAGEMENT RECOMMENDATIONS:** Avoid drainage of site. Control encroachment of woody vegetation through prescribed burning. Timber removal, if desired, may be beneficial to this light-loving plant. Of horticultural interest: protect from removal by irresponsible persons.

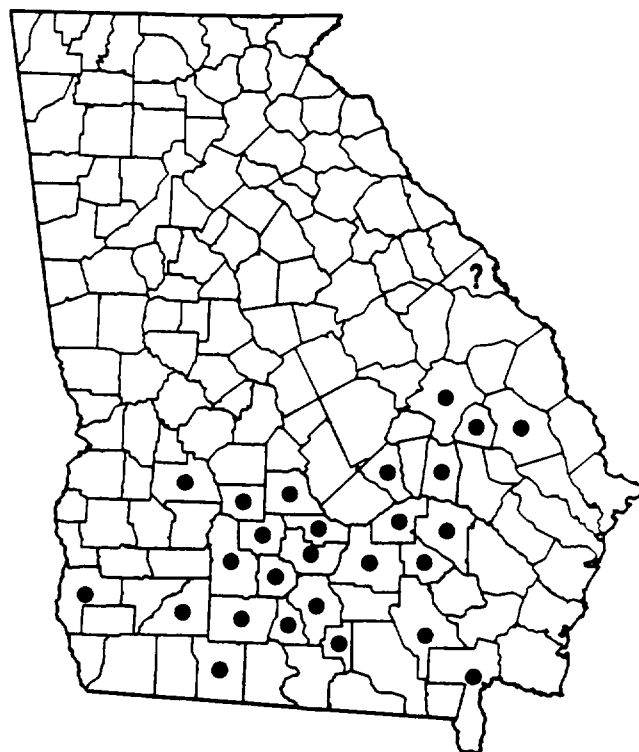
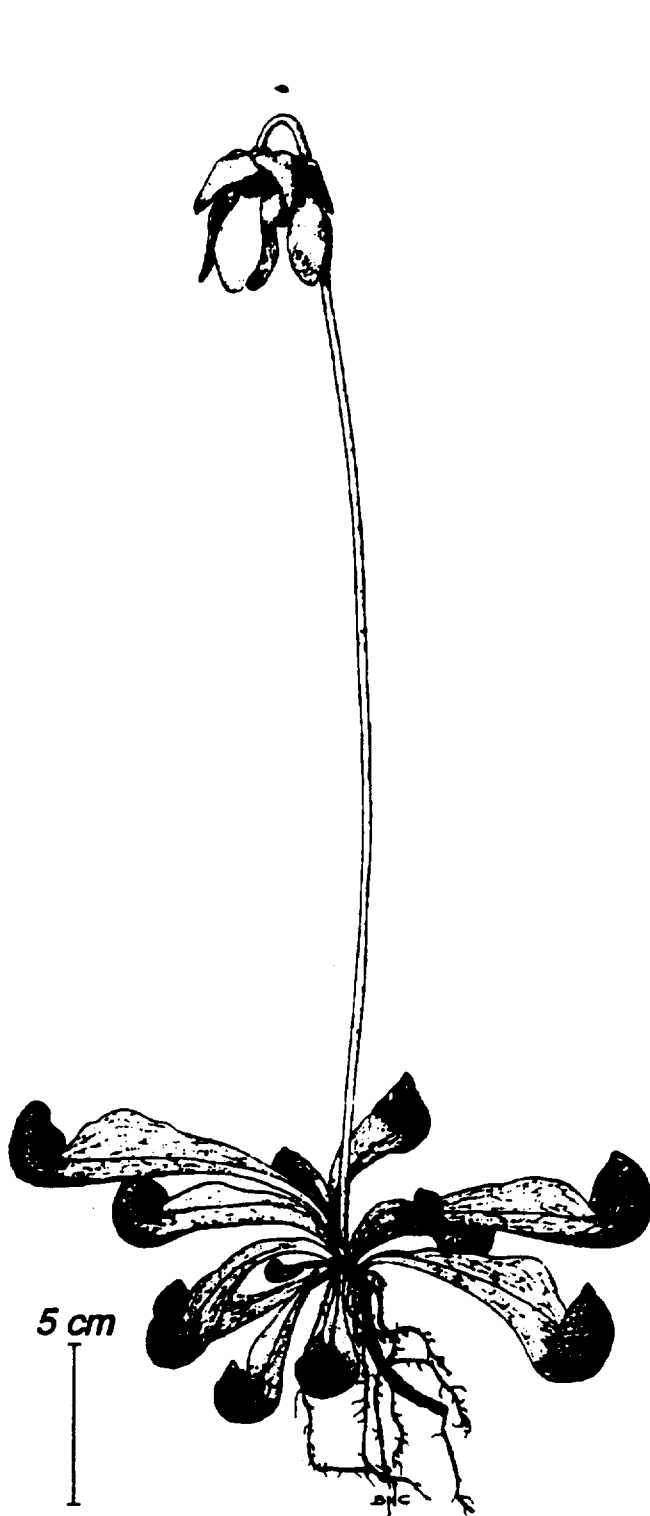
**REMARKS:** This species was illustrated as early as 1576. Thomas Walter gave it its present name in 1788. Because the opening to the pitcher is nearly closed by the hood of this species, much of the light entering the pitchers comes through the clear patches or areolae ("windows"). These "windows" may enhance the efficiency of the pitchers in trapping flying insects that have entered them. In attempting to exit, the insects fly towards the translucent "windows," then either strike the wall of the pitcher and fall in, or crawl around the windowed region until they slip and fall. *Sarracenia minor* has sustained significant habitat loss due to fire suppression or draining of its habitat. Although not truly rare, it, like all other pitcherplants, is vulnerable to excessive digging by nurserymen and gardeners. It is listed as Unusual primarily to allow regulation of commercial activity and to protect populations on public lands.

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- Schnell, D. E. 1976. Carnivorous Plants of the United States and Canada. John F. Blair, Winston-Salem, North Carolina. 125 pp.
- Slack, A. 1979. Carnivorous Plants. The Massachusetts Institute of Technology Press, Cambridge. 240 pp.

Parrot Pitcherplant

Pitcherplant Family, SARRACENIACEAE



**LEGAL STATUS:**

State: THREATENED

Federal: None

**SYNONYMY:** None in current usage.

**RANGE:** Coastal Plain of northeastern Florida and southern Georgia, west to southeastern Louisiana. Recorded from 27 counties in Georgia, including an ambiguous report from the Augusta area (see Remarks), perhaps from Richmond County (see map).

**ILLUSTRATION:** Plant habit, with reclining leaves, 0.4 x. Source: McDaniel (1971), drawn by Barbara Culbertson and used with permission.

**DESCRIPTION:** Perennial herb. This plant is one of the smaller members of this genus, often overlooked. The hollow leaves (pitchers) recline on the ground, in a basal rosette. They are 9–28 cm long, 1.0–1.3 cm wide at the orifice, green at the base, red-veined toward the top, broadest and prominently winged in the upper half. The hood is rounded into a hollow chamber; both it and the adjoining leaf area have translucent "windows." The flowers appear with the leaves, and are

nodding and solitary on long (to about 35 cm), leafless stalks that rise well above the leaves. The five sepals are green and maroon, 1.5–2.5 cm long, and persist at base of fruit. The five petals are maroon, 2.0–4.5 cm in diameter, broadest near the apex, and quickly fall off. A distinctive feature of the pitcherplant flower is the umbrella-shaped style (style-disk), which is 1.8–2.6 cm in diameter in this species. The fruit is a globose capsule about 1 cm in diameter, with numerous seeds. **Flowering period:** March to May; **fruiting period:** June to July, or later. **Best search time:** during flowering, since leaves are usually hidden in vegetation.

**HABITAT:** Found in acidic soils of open bogs, wet savannas, and low areas in pine flatwoods.

**SPECIAL IDENTIFICATION FEATURES:** The mature leaves or pitchers are reclined, prominently winged, with translucent "windows" near the apex, and with hoods rounded. The petal color is maroon.

**MANAGEMENT RECOMMENDATIONS:** Avoid drainage of site. Control encroachment of woody vegetation through prescribed burning. Hand thinning in the vicinity of the plants, if done carefully, may be beneficial to this light-loving plant. Of horticultural interest: protect from removal by irresponsible persons.

**REMARKS:** André Michaux described this species in 1803. Typical of the collections of that era, his specimen label has a general statement of the known range, "from the city of Augusta, Georgia, to Florida," rather than the precise collection site. Both the scientific and common names of this species refer to a fancied resemblance of the pitcher, when viewed in profile, to a parrot's head. Unlike those of the hooded pitcherplant (*Sarracenia minor*), the pitchers of this species are decorated with "windows" over the whole of the (head-like) hood. In view of the supposed function of the windows in the capture of prey, as described for *S. minor*, this may be an adaptation related to the near-horizontal position that the pitchers assume in this species. Unlike most of its kin, *S. psittacina* is often found in areas that are subject to periodic flooding, and its pitchers are specially modified for capture of aquatic(!) prey. *Sarracenia psittacina* has sustained significant habitat loss due to fire suppression or draining of its habitat. Like the other pitcherplants, it is vulnerable to excessive digging by nurserymen and gardeners.

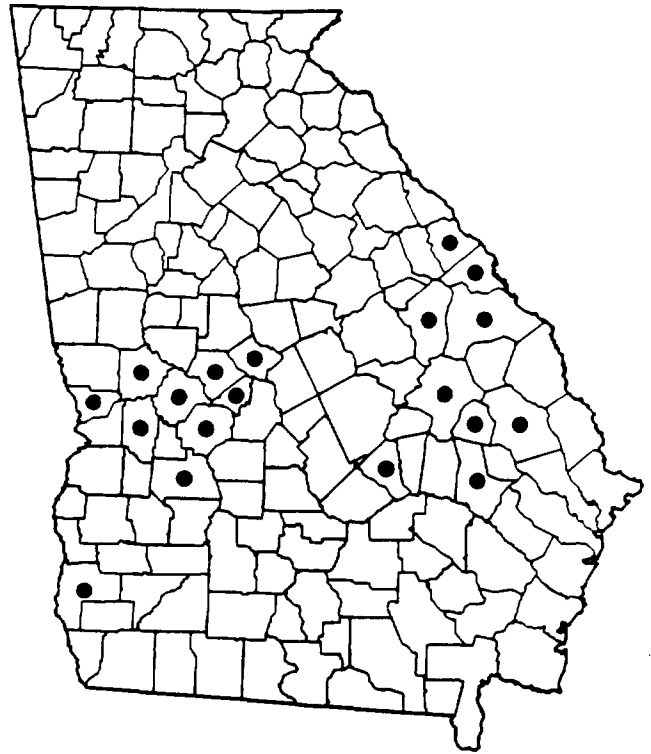
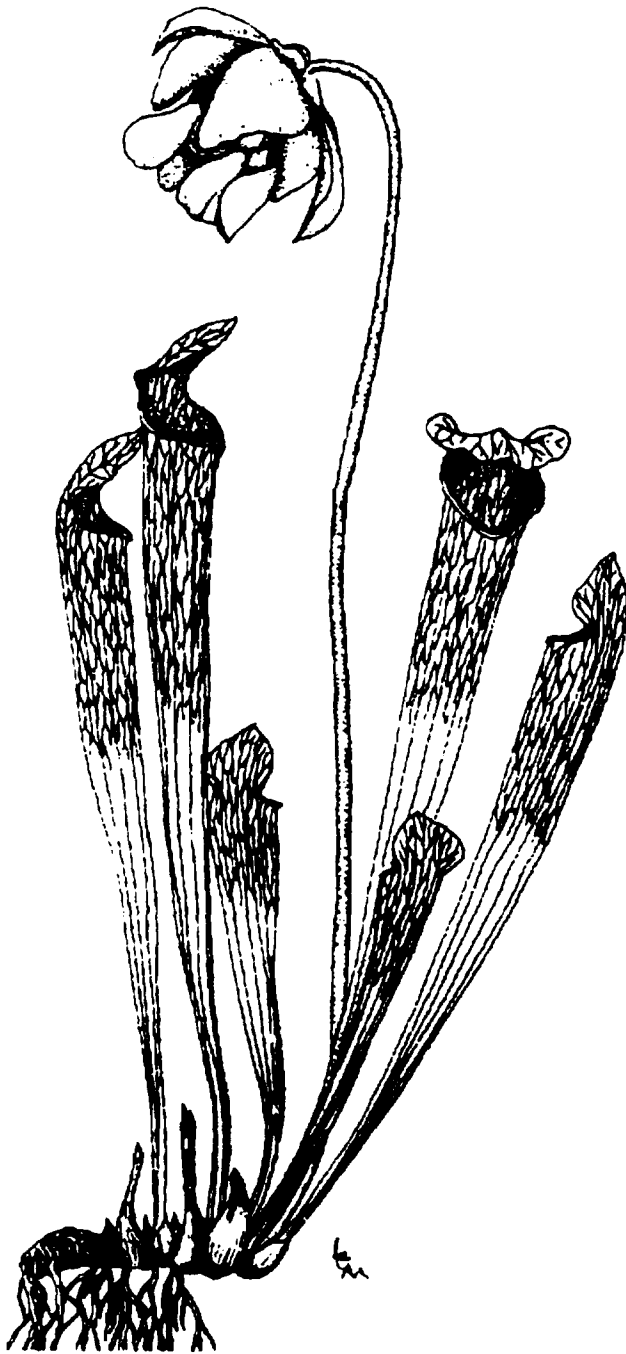
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- Duncan, W. H. and L. E. Foote. 1975. *Wildflowers of the Southeastern United States*. University of Georgia Press, Athens. 296 pp.
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- Schnell, D. E. 1976. *Carnivorous Plants of the United States and Canada*. John F. Blair, Winston-Salem, North Carolina. 125 pp.
- Slack, A. 1979. *Carnivorous Plants*. The Massachusetts Institute of Technology Press, Cambridge. 240 pp.



Sweet Pitcherplant, Red Pitcherplant

Pitcherplant Family, SARRACENIACEAE



**LEGAL STATUS:**

State: ENDANGERED

Federal: None

**SYNONYMY:**

*Sarracenia rubra* Walter subsp. *rubra*

**RANGE:** Coastal Plain of Mississippi to the Florida Panhandle, thence sporadically and mostly on the Inner Coastal Plain in the Fall Line Sandhills of Georgia, north to North Carolina. Recorded from 19 counties in Georgia (see map).

**ILLUSTRATION:** Plant habit, 0.6 x . Source: Ward (1978), drawn by Lisa C. Megahee and used with permission.

**DESCRIPTION:** Perennial herb. The sweet pitcherplant may be up to 75 cm tall. The hollow leaves (pitchers) are green with some red or purplish veins above, 8–68 cm long, and erect; the hoods curve over the orifice, have a network of reddish veins, and are sharply pointed at the tip. The flowers are nodding, fragrant and solitary on long (up to 75 cm), leafless stalks that usually exceed the leaves. The sepals are purplish above, greenish beneath, 1.8–2.7 cm long, and persist

at the base of the fruit. The petals are maroon above, sometimes gray or dull purple beneath, and 2.5–4.0 cm long. Another distinctive feature of the flower is the umbrella-shaped style (style-disk), which is 2.8–4.0 cm in diameter. The fruit is a globose capsule, 0.6–1.2 cm in diameter with numerous seeds. **Flowering period:** April to May; **fruiting period:** June to July. **Best search time:** during entire growing season, especially during flowering.

**HABITAT:** Found in acidic soils of open bogs, sandhill seeps, Atlantic white-cedar swamps, wet savannas, low areas in pine flatwoods, and along sloughs and ditches.

**SPECIAL IDENTIFICATION FEATURES:** The mature leaves or pitchers are erect, broadest at the mouth, and gradually tapered below. The hoods are sharply pointed with entire margins. The petal color is maroon.

**MANAGEMENT RECOMMENDATIONS:** Avoid drainage of site. Control encroachment of woody vegetation through prescribed burning. Timber removal, if desired, may be beneficial to this light-loving plant. Of horticultural interest: protect from removal by irresponsible persons.

**REMARKS:** Thomas Walter described this species in 1788, based upon material collected in South Carolina. *Sarracenia rubra* is the species of pitcherplant that has stimulated the most taxonomic controversy. Some authors regard it as a single species with some regional differentiation, while others perceive as many as five distinct species. A reasonable approach is to recognize geographic races, or subspecies. However, there is no consensus on how many of these should be formally recognized. Two of these subspecies are protected by the federal Endangered Species Act: *S. rubra* subsp. *alabamensis*, of central Alabama, and subsp. *jonesii*, of the Blue Ridge in the Carolinas. In Georgia, detailed studies are needed to determine whether there is any significance to the apparent discontinuous distribution into a western and an eastern concentration (see map). At this time, all material from Georgia is regarded as the typical subspecies, the "true" *rubra* of Walter, and may be designated *S. rubra* subsp. *rubra*. *Sarracenia rubra* has sustained significant habitat loss due to fire suppression or draining of its habitat. It is vulnerable to digging by unscrupulous nurserymen and gardeners.

#### SELECTED REFERENCES:

- Duncan, W. H. and L. E. Foote. 1975. Wildflowers of the Southeastern United States. University of Georgia Press, Athens. 296 pp.
- Godfrey, R. K. and J. W. Wooten. 1981. Aquatic and Wetland Plants of Southeastern United States. Volume 2. Dicotyledons. University of Georgia Press, Athens. 933 pp.
- McDaniel, S. 1971. The genus *Sarracenia* (Sarraceniaceae). Bulletin Number 9. Tall Timbers Research Station, Tallahassee, Florida. 36 pp.
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- Schnell, D. E. 1976. Carnivorous Plants of the United States and Canada. John F. Blair, Winston-Salem, North Carolina. 125 pp.
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***Stylisma pickeringii* (Torrey ex M. A. Curtis) Gray var. *pickeringii* 193**

Pickering Morning-glory, Pickering Dawnflower

Morning-glory Family, CONVULVULACEAE

**LEGAL STATUS:**

State: THREATENED

Federal: CANDIDATE

**SYNONYMY:**

*Bonamia pickeringii* (Torrey ex M. A. Curtis)  
Gray

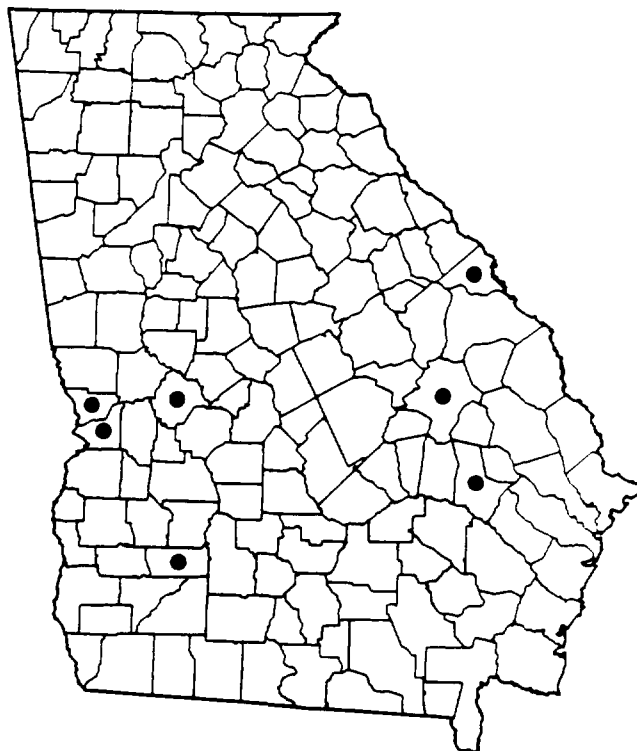
*Breweria pickeringii* (Torrey ex M. A. Curtis)  
Gray

*Convolvulus pickeringii* Torrey ex M. A. Curtis

**RANGE:** Scattered on the Coastal Plain, especially on sandhills along the Fall Line, from Alabama to southeastern North Carolina; disjunct in the Pine Barrens of New Jersey. Recorded from seven counties in Georgia (see map).

**ILLUSTRATION:** flowering branch, trailing with upright leaves, 1 x; note long bracts on flower stalks. Source: original drawing by Vicky Holifield.

**DESCRIPTION:** Perennial, creeping vine. The stems sprawl over the ground from a central crown, each primary stem to 1-2 m or more in



length and capable of branching extensively, forming, when luxurious, an intertwined network of trailing stems. The leaves are held upright, and are entire, linear, 2.5–7.0 cm long, 1–3 mm wide, with the apex acute to obtuse, and with the base narrowly tapered to a short (2 mm) leafstalk. The flowers are axillary, solitary or in clusters with as many as five flowers atop a stalk 3–7 cm long, about as long or longer than subtending leaves. Near the base of the flowers are conspicuous bracts that are leaflike, linear, and 1.5–2.5 cm long. The flowers are white, 1.2–1.8 cm wide, with five fused petals forming a funnel-like shape. The five sepals are 4–6 mm long, 3–5 mm wide, ovate, and covered with yellowish-brown hairs. The ovary has a single style that is evenly cleft; each style branch is 2–3 mm long (style base is 3–4 mm long), and ends in a knob-shaped (capitate) stigma. The fruit is a globose capsule with one or two seeds. **Flowering period:** late May to mid-August; **fruiting period:** June to October. **Best search time:** during flowering, since plants deteriorate rapidly toward the end of a droughty summer.

**HABITAT:** Found in coarse, white sands on sandhills near the Fall Line, and on a few ancient dunes along the Flint and Ochopee Rivers. These are scrub habitats with scant litter accumulation, sparse ground cover, and little canopy cover, the latter consisting mostly of scattered scrubby oaks and pines.

**SPECIAL IDENTIFICATION FEATURES:** The genus *Stylisma* is differentiated from other morning-glories by having small, funnel-like flowers on stalks about as long or longer than the subtending leaves; and styles with two branches, each with a knobby stigma. The Pickering morning-glory is striking in the field with its narrow, linear leaves held upright, usually at a 60-degree angle or more from the ground. In addition, *Stylisma pickeringii* has floral bracts longer (more than 1.5 cm long) than the flowers. Only one other *Stylisma* in Georgia has linear leaves and occurs in the same habitat as Pickering morning-glory. This is *S. patens* var. *angustifolia*. In contrast, its leaves are nearly horizontal and its floral bracts are shorter (less than 1 cm long) than the flowers.

**MANAGEMENT RECOMMENDATIONS:** Control encroachment of woody vegetation through prescribed burning. Timber removal, if desired, may be beneficial to this light-loving plant.

**REMARKS:** Moses Ashley Curtis described this species in 1835, as a *Convolvulus*, based on his

collection of the previous year from Wilmington, North Carolina. Asa Gray transferred it to *Stylisma* in 1857. A second variety, *S. pickeringii* var. *pattersonii* occurs from Texas to Illinois and is not particularly rare. In 1901 Alfred Cuthbert made the first collection of var. *pickeringii* from Georgia, in Richmond County. It has since been found at about a dozen locations in Georgia. *Stylisma pickeringii* is rare throughout its range. It has a state status of Endangered in both New Jersey and North Carolina.

#### SELECTED REFERENCES:

- Gleason, H. A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. Second Edition. New York Botanical Garden, Bronx. 910 pp.
- Myint, T. 1966. Revision of the genus *Stylisma* (Convolvulaceae). Brittonia 18:97–117.
- Radford, A. E., H. E. Ahles, and C. R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press, Chapel Hill. 1183 pp.
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GEORGIA'S PROTECTED WILDLIFE COUNTY CROSS-REFERENCE

RECEIVED  
NOV 24 1992  
Commercial Protection Div.  
Hazardous Waste Mgmt. Branch

Federal  
SHORTNOSE STURGEON E  
SPOTFIN CHUB T  
YELLOWFIN MADTOM T  
SOUTHERN CAVERFISH  
AMBER DARTER E  
CONASSAUGA LOGPERCH E  
SNAIL DARTER T  
GEORGIA BLIND SALAMANDER  
ATLANTIC GREEN TURTLE T  
ATLANTIC HAWKSBILL  
LOGGERHEAD T  
ATLANTIC RIDLEY E  
LEATHERBACK E  
AMERICAN ALLIGATOR T  
EASTERN INDIGO SNAKE T  
EASTERN BROWN PELICAN  
WOOD STORK E  
SOUTHERN BALD EAGLE E  
PEREGRINE FALCON E  
PIPING PLOVER T  
RED-COCKADED WOODPECKER E  
IVORY-BILLED WOODPECKER E  
BACHMAN'S WARBLER  
KIRTLAND'S WARBLER E  
GRAY BAT E  
INDIANA BAT E  
SHERMAN'S POCKET GOPHER -  
COUGAR E  
SEI WHALE E  
FIN WHALE E  
HUMPBACK WHALE E  
BLACK RIGHT WHALE E  
SPERM WHALE E  
WEST INDIAN MANATEE E

Appling  
Atkinson  
Bacon  
Baker  
Baldwin  
Banks  
Barrow  
Bartow  
Ben Hill  
Berrien  
Bibb  
Bleckley  
Brantley  
Brooks  
Bryan  
Bulloch  
Burke  
Butts  
Calhoun  
Camden  
Candler  
Carroll  
Catoosa  
Charlton  
Chatham  
Chattahoochee  
Chattooga  
Cherokee  
Clarke  
Clay  
Clayton  
Clinch  
Cobb  
Coffee  
Colquitt  
Columbia  
Cook  
Coweta  
Crawford  
Crisp

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X=General occurrence, see appendix; O=Occurs in offshore waters only;  
W=Winter occurrence only; S=Summer occurrence only; M=Occurs irregularly  
as a migrant; R=Release or potential release site; H=Historical occurrence

1

X=General occurrence, see appendix; O=Occurs in offshore waters only;  
W=Winter occurrence only; S=Summer occurrence only; M=Occurs irregularly  
as a migrant; R=Release or potential release site; H=Historical occurrence

X=General occurrence, see appendix; O=Occurs in offshore waters only;  
W=Winter occurrence only; S=Summer occurrence only; M=Occurs irregularly  
as a migrant; R=Release or potential release site; H=Historical occurrence

**OVERSIZED**

**DOCUMENT**

GEORGIA ENVIRONMENTAL PROTECTION DIVISION  
HAZARDOUS SITE INVENTORY  
July 1, 1995

Site Number: 10076  
SITE SUMMARY

SITE NAME:

Figgie Fire Systems

LOCATION:

204 East Meadowlake Parkway  
Swainsboro, Emanuel County, GA 30401

Latitude: 32° 34' 54" N    Longitude: 82° 18' 47" W

LAST KNOWN PROPERTY OWNER AND MAILING ADDRESS:

Figgie Properties  
28300 Euclid Ave, Suite 100  
Cleveland, OH 44092

DESCRIPTION OF REGULATED SUBSTANCES RELEASED AT THE SITE, AND THREATS TO HUMAN HEALTH AND THE ENVIRONMENT POSED BY THE RELEASE:

This site has a suspected release of Lead in groundwater at levels exceeding the reportable quantity. No human exposure via drinking water is suspected from this release. The nearest drinking water well is less than 0.5 miles from the area affected by the release.

STATUS OF CLEANUP ACTIVITIES: No HSRA cleanup or investigation has been initiated at this site.

CLEANUP PRIORITY: The Director has designated this site as Class II.

GA EPD DIRECTOR'S DETERMINATION REGARDING CORRECTIVE ACTION:

Pending